TOUR THE SUB FORCE MUSEUM pg. 12

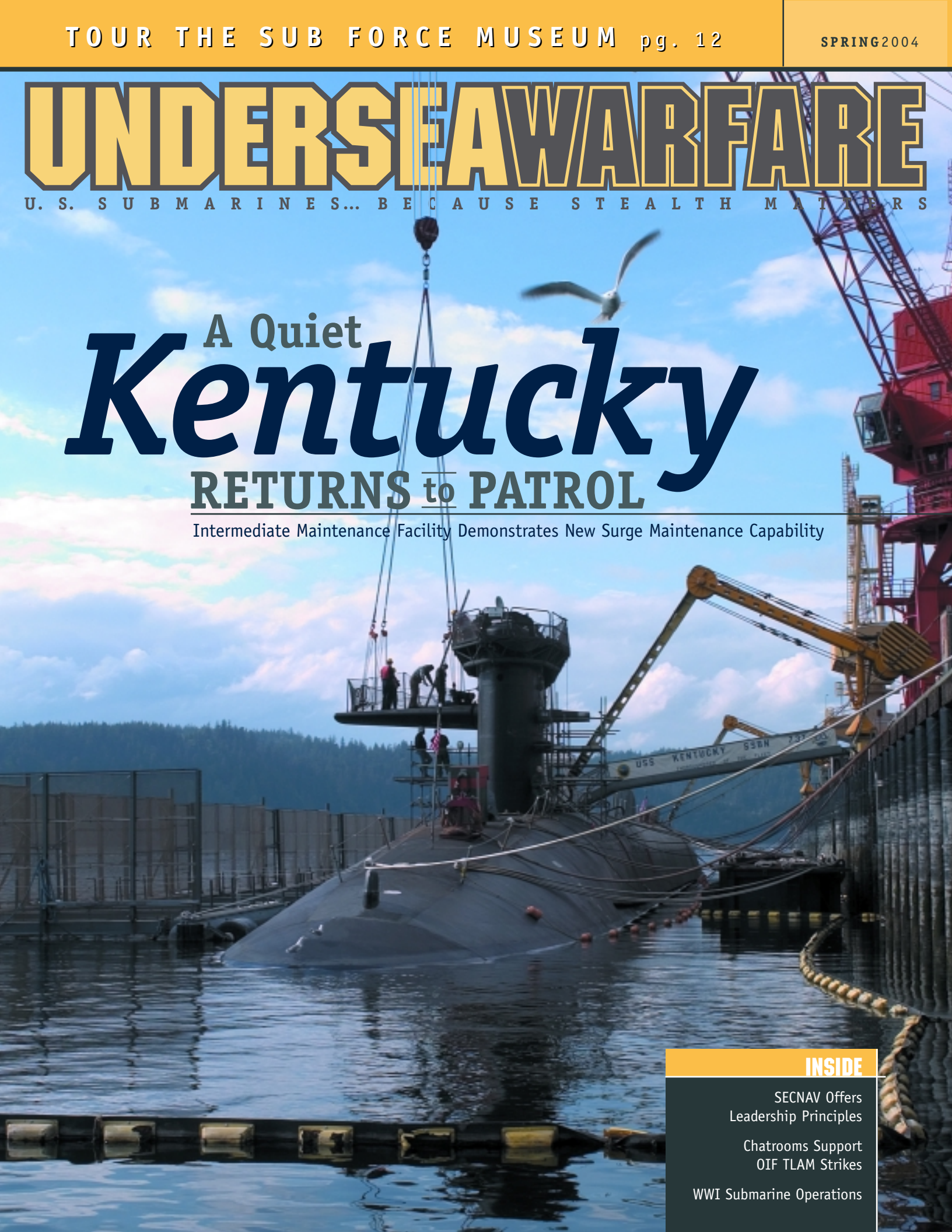
SPRING2004

UNDERSEA WARFARE

U. S. SUBMARINES... BECAUSE STEALTH MATTERS

A Quiet Kentucky RETURNS to PATROL

Intermediate Maintenance Facility Demonstrates New Surge Maintenance Capability



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A Quiet Kentucky RETURNS TO PATROL

by Katie Eberling

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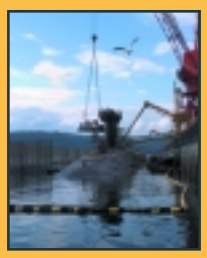

On The Cover

Near the end of an unusually long refit necessitated by major repairs to her fairwater planes, USS *Kentucky* (SSBN-737) has her starboard plane reinstalled at IMF Bangor. Accomplished while the ship was afloat, this delicate evolution required skillful coordination among crane operators, riggers, and the entire waterfront crew. To read more about IMF, Bangor's unprecedented maintenance support to *Kentucky* – and how this may soon have an impact on your next maintenance period, see page 16!

Photo by Brian Nokell, NSB Bangor Visual Information

UNDERSEA WARFARE is online at: www.chinfo.navy.mil/navpalib/cno/n87/mag.html

THE OFFICIAL MAGAZINE OF THE U.S. SUBMARINE FORCE

UNDERSEAWARFARE

U.S. SUBMARINES...BECAUSE STEALTH MATTERS

Charter

UNDERSEA WARFARE is the professional magazine of the undersea warfare community. Its purpose is to educate its readers on undersea warfare missions and programs, with a particular focus on U.S. submarines. This journal will also draw upon the Submarine Force's rich historical legacy to instill a sense of pride and professionalism among community members and to enhance reader awareness of the increasing relevance of undersea warfare for our nation's defense.

The opinions and assertions herein are the personal ones of the authors and do not necessarily reflect the official views of the U.S. Government, the Department of Defense, or the Department of the Navy.

Contributions and Feedback Welcome

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"Change and adaptation are central to our success as a tool for our nation's leaders. Flexibility and smart problem solving have been key parts of the way we have operated since the beginning of the Submarine Force..."

In this issue, I must leave you with my final thoughts as Director, Submarine Warfare Division. I am moving on to my next assignment as Commander of the *Harry S. Truman* Carrier Strike Group. My time at the helm has been short, about 11 months, but extremely rewarding. Your performance has been key to paving the way for the Navy of the future, as well as our ability to articulate the warfighting attributes required for successful joint warfare in the near, mid and far term.

I recently spoke to our future submariners at the U.S. Naval Academy's celebration of our Force's 104th Birthday. I discussed the historical pattern of fast paced evolution and unexpected change that has shaped our equipment, tactics and submarines throughout the ages. Change and adaptation are central to our success as a tool for our nation's leaders. Flexibility and smart problem solving have been key parts of the way we have operated since the beginning of the Submarine Force, and that will never change. Optimization and efficiency are core to our consciousness. An optimist sees a glass that is half full, a pessimist sees a glass that is half empty, and a submariner sees a glass that is twice as big as it needs to be. Bold, smart, dedicated experts… respectful of the environment in which we operate, personally responsible and team oriented, our own toughest critic, with a "behind the enemy lines" mentality… these are our defining characteristics, and they are as important today as they were more than a century ago. We must continue to lead the way in embracing change and perpetuating institutional values. I witnessed these valuable traits, and many more, in the performance of our ships during Operation Iraqi Freedom and the ongoing Global War on Terrorism while in this job.

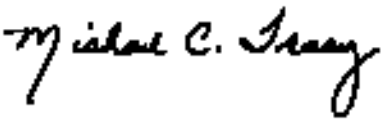
Operationally, you know the cut of our jib… well documented in the history books and at numerous lectures and speaking venues. But in the area of resourcing, you may understand little of our legacy and contributions on the OPNAV staff. Formerly OP02, N87, and now N77, this organization has led the way in bold and innovative processes and programs for our Navy: Open Architecture; Acoustic Rapid COTS Insertion (ARC-I); modular and re-configurable platforms and equipment; concepts-to-reality that optimize propulsion, energy and manpower utilization. With NAVSEA's help, Portsmouth Naval Shipyard is using the Ship Availability Planning and Engineering Center (SHAPEC) process to significantly reduce the cost of availability planning through centralized development and reuse of planning products for our fleet of 688s; Common Radio Rooms with digital crypto; precision high-frequency acoustic development for onboard and off board systems; autonomous vehicles; and there are numerous others. We are at the forefront in developing warfighting capabilities and requirements as co-chair of both the Sea Shield and Sea Strike Pillars within N7, as well as leading the USW Branch of Sea Shield. We are also helping to pave the way in rigorous qualitative and quantitative assessments through our involvement in Modeling and Simulation techniques, as well as in our role as warfighting "subject matter experts." Access is the key to relevance, both in real warfighting and in influencing future warfare. We have access in N7 - come join us!

In short, it is an exciting time for the Submarine Force and an exciting time to be assigned to OPNAV N77. Our staff is exceptional and our contributions to improving the Navy are well appreciated. Like those of you completing a tour on the waterfront, we share the profound satisfaction that comes from having undertaken an important, difficult job that few people could do well, and we are doing it in the service of our country.

I depart this pulpit with what I see are our two biggest challenges for the future. First, we must continue to manage well our most important resource - our people. Personal and professional growth across the broad spectrum of capabilities needed from today's Sea Warrior is at the height of our focus. Fortunately, we have some of our best talent working this challenge. Second, we must continue to emphasize the warfighting capabilities we bring to the "right force" with the "right readiness" at the "right cost." No more and no less – with the appropriate rate of modernization necessary to assure long-term relevance. We will continue our efforts to sustain a Submarine Force sized to meet future joint warfighting requirements (pre- and post-hostilities) without straining our valuable submarine personnel beyond the point of effectiveness.

I am honored and humbled by the faith the Navy has placed in this submarine officer to have served on this staff and to transition to CSG command. I look forward to serving with the men and woman of the *Harry S Truman* CSG. I will miss the adventure and daily challenge of serving you in Washington, D.C. My exposure to the issues that will define our Submarine Force, our Navy and our military have given me valuable insight as I return to the waterfront.

I leave you in the very capable hands of RDML Joe Walsh, who comes to the Pentagon after a successful tour as COMSUBGRU2/CNRNE. I sincerely thank my entire staff, and in particular, RDML Mark Kenny (77B) and CAPT Bill Hoeft (EA), for their superbly dedicated efforts this past year on behalf of our Navy. The fruits of their study and labor have been significant.



RADM(sel) Michael C. Tracy, USN
Director, Submarine Warfare

Q&A

SECNAV's Principles of

"America owes a profound debt of gratitude to all those who have volunteered for the silent service," comments Secretary of the Navy Gordon R. England, about the USS *Nautilus*' recent 50th anniversary of her christening. England is only the second person in history to serve twice as Secretary of the Navy and the first to serve in back-to-back terms. England has been the 72nd and 73rd Secretary, but his service was interrupted when President George W. Bush tapped him to serve as the first Deputy Secretary in the Department of Homeland Security in November 2002. England, a native of Baltimore and long time resident of Fort Worth, Texas spent nearly 40 years in industry, including stints as President of General Dynamics Land Systems and General Dynamics Aircraft Company, later Lockheed Aircraft Company. He also led General Dynamics as Executive Vice President before joining the Navy Department in 2001. Recently, Secretary England took time to address questions on the minds of many in today's submarine force.

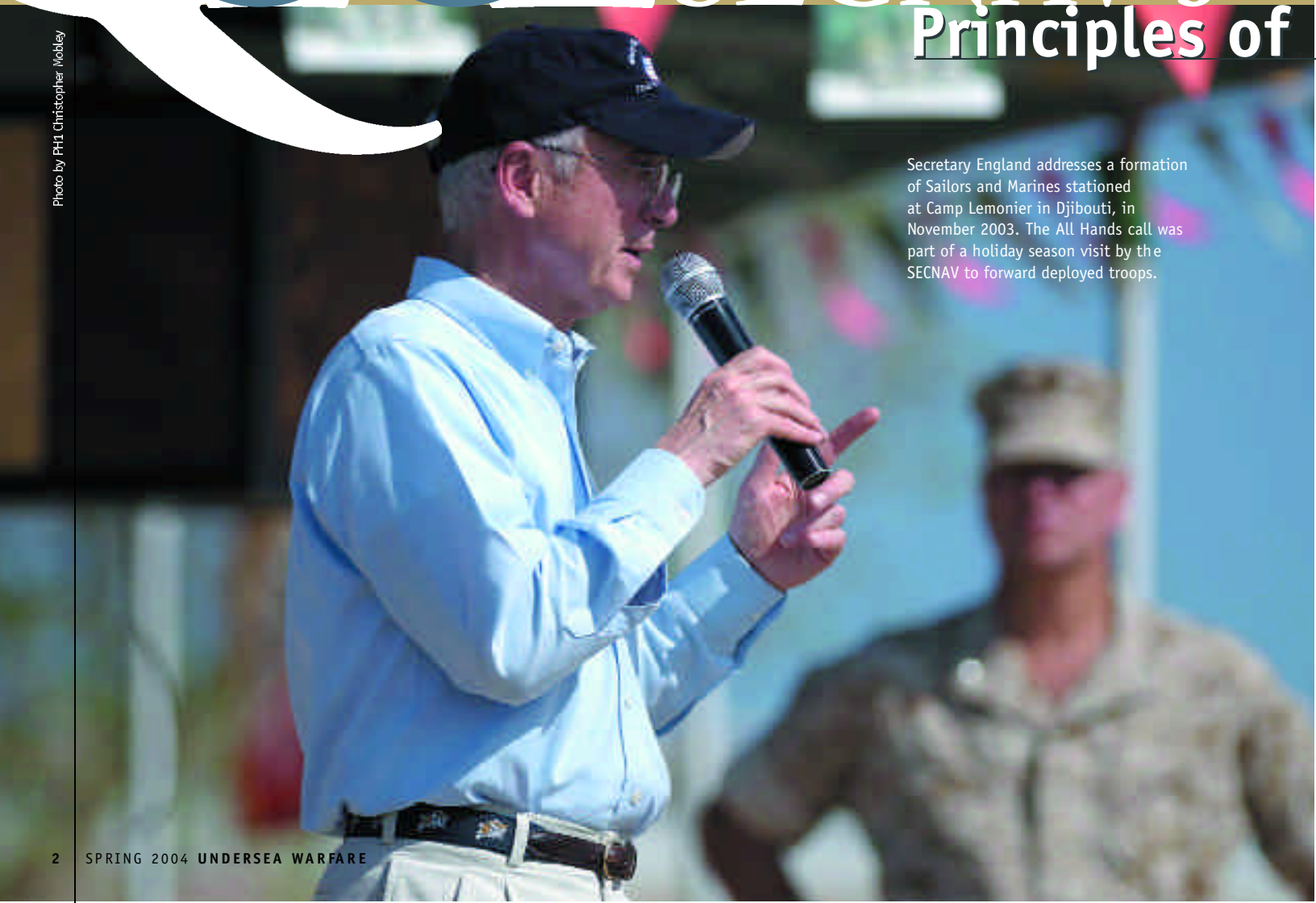


Photo by PH1 Christopher Mobley

Secretary England addresses a formation of Sailors and Marines stationed at Camp Lemonier in Djibouti, in November 2003. The All Hands call was part of a holiday season visit by the SECNAV to forward deployed troops.

Gordon R. England, Secretary of the Navy, speaks to Sailors on board the *Los Angeles*-class attack submarine USS *Charlotte* (SSN-766) pierside at Naval Submarine Base Pearl Harbor, Hawaii in February 2004. The Secretary arrived in Hawaii following a trip to the Asia-Pacific region that included visits to Japan, Singapore and Guam.

Photos by PH2 John F. Looney

Leadership for the U.S. Submarine Force

Q: How important has the Submarine Force been in the Global War on Terrorism?

A: The Submarine Force has played a vital role in our Navy for many decades, and this vitality will continue. From World War II, throughout the Cold War and the first Gulf War, the submarine service has contributed significantly to peace and security. I've visited several boats while visiting the fleet and the crews are magnificent. In the Global War on Terrorism the strike, surveillance, and special operations capabilities of our Submarine Force have and will continue to play a large part in winning this war.

Q: The Navy is investing in new submarines and you have visited some under construction. What's your impression?

A: I've been very impressed. America has the finest shipyards and builds the best boats in the world. The men and women at Electric Boat and Northrop Grumman Newport News have a vital role to play in our national defense, and they take great pride in the work. We will continue to invest in the Submarine Force, which provides special capabilities to our war fighters and leadership. The congressional leaders from Virginia, Connecticut, Rhode Island and other key states have been very supportive as well. Our submariners deserve the best, and our shipbuilders consistently provide it.

Q: You recently visited Hawaii and saw first hand the Advanced SEAL Delivery System. How important is that system for our SEALs and the Submarine Force?

A: Our SEALs are the best at what they do, and the ASDS enhances their capabilities even more. This program is very complex but also very important to our nation. I visited the SEALs in Hawaii who are training with ASDS to see the system first hand. This program provides our Navy with a unique ability to utilize our special forces more effectively then ever before.

Q: The Navy effectively grew the Submarine Force by retaining four SSBNs and converting them to SSGNs. What effect will those submarines have when they finish reconfiguration and rejoin the fleet?

A: By reconfiguring four of our SSBNs and converting them to SSGNs we are enhancing our combat power, improving our special warfare capabilities and saving the tax payers hundreds of millions of dollars. These "new" boats will be capable of a variety of missions and with UUVs [unmanned underwater vehicles], they will be able to adapt and expand their missions in the future.

Q: Unmanned and remotely piloted aircraft, vehicles and vessels are playing a larger role in our military. Do you see these systems as having an important role in the Navy's future?

A: Unmanned systems will play a very important role in all areas of the armed forces and our day-to-day lives in the near future. The Submarine Force is at the cutting edge in many of these areas, and together with the Office of Naval Research and our partners in industry and academia we will see further advances in this new science and capability.

Secretary England holds an "All Hands" call during a visit with SEAL Delivery Vehicle Team One (SDVT-1).

Photo by PHAN Benjamin Glass

(left) Secretary England departs USS *Charlotte* (SSN-776) followed by ADM Walt Doran, Commander Pacific Fleet and RADM Paul Sullivan Commander Submarine Force Pacific Fleet.

(far left) First Lady Laura Bush is joined by Senator John Warner, Northrop Grumman Newport News President Tom Schievelbein, and Secretary England at the keel laying for USS *Texas* (SSN-775) on 12 July 2002. *Texas* is the second of the *Virgina*-class SSNs under construction.

Principles of Leadership

At the United States Naval Academy's Forrestal Lecture Series, Secretary of the Navy Gordon England identified important principles of leadership based on his personal experiences as a business executive and as the 72nd Secretary of the Navy.

Those fifteen principles are as follows:

- **> Provide an environment for every person to excel**
- **> Treat every person with dignity and respect — nobody is more important than anyone else**
- **> Be forthright, honest, and direct with every person and in every circumstance**
- **> Improve effectiveness to gain efficiency**
- **> Cherish your time and the time of others — it is not renewable**
- **> Identify the critical problems that need solution for the organization to succeed**
- **> Describe complex issues and problems simply so every person can understand**
- **> Never stop learning — depth and breadth of knowledge are equally important**
- **> Encourage constructive criticism**
- **> Surround yourself with great people and delegate to them full authority and responsibility**
- **> Make ethical standards more important than legal requirements**
- **> Strive for team-based wins, not individual**
- **> Emphasize capability — not organization**
- **> Incorporate measures and metrics everywhere**
- **> Concentrate on core functions and outsource all others**

Q: The Navy and industry have been pushing towards a multi-year submarine buy. What is the status of these plans?

A: We now have a five-year multi-year procurement of one *Virginia*-class submarine per year through FY 08. We are working closely with Congress and industry on all of our shipbuilding programs.

Q: The number of submarines is remaining steady at about 55. Will this number remain constant in the years ahead?

A: Our great CNO, ADM Vern Clark, ADM Skip Bowman, and I talk often about the size of our Navy and will adjust to meet the threat and put to sea the most formidable and capable force we can. We have a study underway to determine the force levels we will need in the future. The Submarine Force does a magnificent job and the capability they bring to the table sets our Navy apart from the rest of the world.

Q: The Navy is christening and commissioning some notable submarines

this year. Can you discuss these upcoming events?

A: This summer we will christen and commission several new boats. In June, *Jimmy Carter* (SSN-23), whose sponsor is former first lady Roslyn Carter, will be christened in Groton, Connecticut. First Lady Laura Bush will do the honors when *Texas* (SSN-775) is christened in July. And later this year, the daughter of President Lyndon Johnson, Lynda Johnson Robb will participate in the *Virginia* (SSN-774) commissioning as this boat enters the fleet. This is a big summer for our submarine service as *Virginia* becomes operational and other boats reach important milestones.

Q: You have emphasized safety and the importance of voting in many of your "All Hands" calls with Sailors and Marines. Why are these two topics so important to you?

A: Safety and voting are very important to me both personally and as SECNAV. The Navy is a family, and as a family we care about each other. Whether in combat, training or in our personal lives, we all need to be alert, take care of one another, and ensure we do things safely.

Voting is a precious right and one that those who wear the uniform put themselves into harm's way to defend. It's important that everyone check with their voting officers, register, and request an absentee ballot soon so they can make sure they can exercise this right and duty. Register early.

Q: USS *Nautilus* celebrates its 50th anniversary in 2004. What message do you have for submariners past and present?

A: America owes a profound debt of gratitude to all those who have volunteered for the silent service. In this 50th anniversary year of *Nautilus*' commissioning, we are recognizing the debt we owe to the shipbuilders and crew of *Nautilus* for their historic contribution to our Navy and our nation. Today's Submarine Force is the heir to one of the greatest legacies in naval lore, and their performance each day adds to that grand heritage. America is thankful for your service.

Photo by JOC Craig P. Strawser

"We are working closely with Congress and industry on all of our shipbuilding programs."

Photo by JOC Craig P. Strawser

(top) Secretary England gives testimony to members of the House Armed Services Committee concerning the Fiscal Year 2005 National Defense Authorization Budget Request for the Department of the Navy. Secretary England shares the witness table with ADM Vern Clark, Chief of Naval Operations (CNO) and GEN Michael W. Hagee, Commandant of the Marine Corps. *(bottom)* Secretary England gives testimony to members of the Senate Appropriations Committee concerning the Fiscal Year 2005 National Defense Authorization Budget Request for the Department of the Navy.

by JOSA Andrew Zask, USN

Sailors practice repairing leaks in the wet trainer at the Submarine Training Facility (SUBTRAFAC) Norfolk. Training for these situations will help prepare Sailors for emergencies in the real world.

Five-Vector MODEL:

FOCUSED ON TRACKING QUALIFICATIONS

The Sailor Continuum, or Five-Vector Model (5VM), is a symbol at the core of every Sailor's personal and professional development. And coming in spring 2004, it will be available for submarine ratings.

5VM is a powerful piece of software, which will allow Sailors to keep track of their careers in the Navy and take credit for their accomplishments. Available at Navy Knowledge Online (www.nko.navy.mil), 5VM is customized to match each Sailor's rating, pay grade and past accomplishments.

5VM breaks down the skills and knowledge that Sailors need to be successful into five categories: Professional development, personal development, military education and leadership, certifications and qualifications, and performance.

The Sailor Continuum is the brainchild of the Navy's Task Force for Excellence through Education and Learning (EXCEL). Task Force EXCEL has been the catalyst for the Navy's revolution in training.

“The continuum is going to increase mission effectiveness by providing the fleet with a stable and balanced force that is smarter and more motivated.”

Submariners plot a course in Norfolk’s SUBTRAFAC. By honing their skills in facilities like this, Sailors will be better prepared to meet challenges at sea.

According to Submarine Learning Center Command Master Chief (SS) Peter J. Berns, “Each five-vector model is based on an enlisted rating, and each five-vector model is specifically engineered to the individual.”

Berns said the 5VM will help Sailors take charge of their careers. “For many years, he goes through his ‘A’ school, and then what do you do?”

“What’s your next step to be a second class… what’s your progression to make chief? Not too many enlisted people could tell you that,” he continued. “But with this five-vector model, it’ll be all listed right there; it’ll tell them how to progress.”

Former Task Force EXCEL Director VADM Harry Ulrich concurred with that, saying, “The continuum is going to increase mission effectiveness by providing the fleet with a stable and balanced force that is smarter and more motivated.”

Berns said submariners can look forward to logging into their 5VM this spring. “We want to have the five-vector model for the submarine rates online by 1 April, so that people can actually go on to NKO and call up their five-vector model and, for the first few months at least, be able to look at the list of the tasks required of an MMW, or an MM ‘A’-ganger, or an ST,” Berns explained.

“Right now we’re just working on the tasks that submariners perform based on the warfare, general, and watchstation qualifications that exist in the fleet today,” he continued. “Every submariner knows that we live, eat, and breathe qualifications onboard submarines, and we generally know where a guy needs to be at what point in his career to complete a specific qualification.”

According to Berns, information contained in a Sailor’s 5VM would carry over from command to command. “It will all be laid out for him, and it will also be a resume so that every time he qualifies something or completes a school or accomplishes a qualification, it will be logged in there and it will be maintained in his record for life,” Berns said. “This way, a Sailor won’t have to get the same qualifications twice.”

Berns added that 5VM isn’t the only abbreviation people need to know. “People need to know that there’s a new term out there called KSATs, which stands for Knowledge, Skills, Abilities and Tools, which is what the whole five-vector model is based on,” Berns said. KSATs will let Sailors in every rating and pay grade know what they need to know and what they need to be able to do to hold their positions.

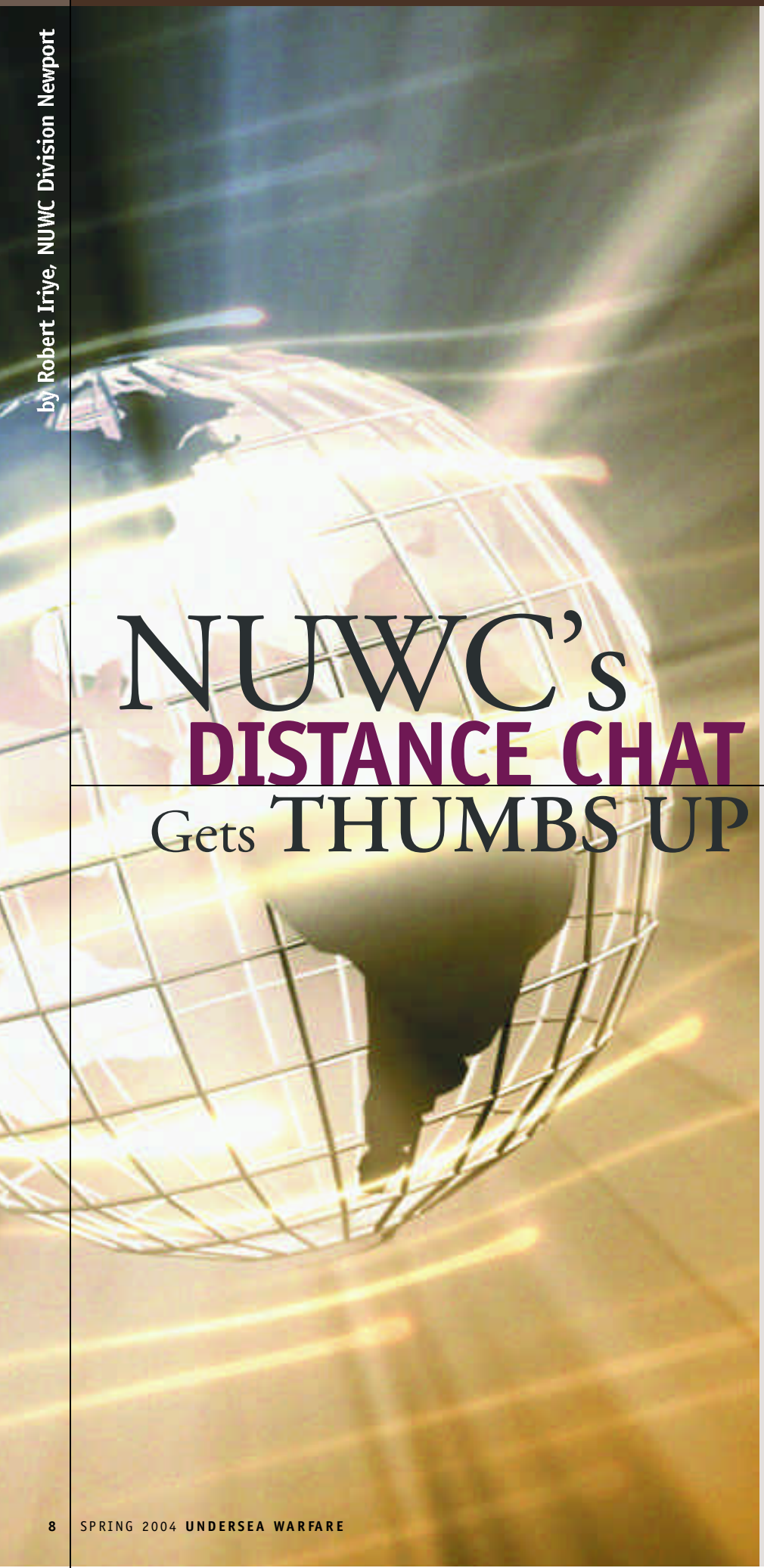
“That’ll be a very common acronym in the future,” he added. Berns stated that the 5VM will show Sailors the KSATs they have earned and tell them what KSATs they need to advance.

Berns wants to spread awareness of the Navy’s revolution in training. “If anybody hears that I’m coming to town to give a brief, I really encourage those guys to come and attend, so that they can ask me all kinds of questions, and I can be there available to answer them,” he exclaimed.

Through 5VM, Sailors have the ability to take charge of their careers. With just a few clicks at NKO, Sailors have access to what can amount to weeks of research. And using the 5VM, they know what information they need and when they need it.

JOSA Zask is a Navy Journalist assigned to Commander, Naval Submarine Forces Public Affairs, Naval Submarine Forces Public Affairs.

by Robert Iriye, NUWC Division Newport



NUWC's DISTANCE CHAT CAPABILITY Gets THUMBS UP from the Fleet

We've all heard warnings about being careful about whom we talk to in a chat room. After all, you never know who's on the other end of that instant message. But during Operation Enduring Freedom, NUWC Division Newport brought a chat room to a submarine thousands of miles away and started a highly successful distance-support capability for the Tomahawk weapon system.

It started in October 2001 with an overseas communication from an enlisted fire control technician who had been previously detailed to NUWC. He was now assigned to a deployed SSN supporting Operation Enduring Freedom and had run into a problem with an onboard Tomahawk missile. It was a long shot, but he knew if anyone could help, it was the NUWC engineers who had the resources and corporate knowledge to provide troubleshooting and technical guidance.

Utilizing the Secret Internet Protocol Network (SIPRNet), NUWC contacted the boat and provided direct real-time feedback and chat-room capability. The problem was discussed, troubleshooting was conducted, and an All Up Round (AUR) was returned to service and later employed operationally. The theater commander saw the immediate benefit of this chat-room access. Based on its success, the Submarine Tomahawk Action Board took the initiative and assigned NUWC to develop a chat capability for all deployed platforms in theater.

In response to a Type Commander (TYCOM) request for contingency planning for Operation Iraqi Freedom, NUWC implemented 24/7 chat capability over the SIPRNet with COMFIFTHFLT, COMSIXTHFLT, COMSUBLANT and COMSUBPAC. This capability was stood up in February 2003, and it is supported by all

NUWC technical codes. The primary objective is to respond rapidly to any Tomahawk strike-capability issues on deployed platforms, while still allowing Fleet and TYCOM oversight.

Although bandwidth-limited, this communication channel provides two-way, real-time text communications with deployed platforms to assist in strike planning, exercises, and missions. It also reaches shore mission-planning activities and battle groups.

Since implementing 24/7 chat capability, NUWC has monitored and responded to emerging issues affecting combat systems, communications, launchers, and the Tomahawk AUR. NUWC, with support from other Navy organizations, has participated in over 30 separate chat sessions with eight forward-deployed platforms to resolve mechanical, electronic, and mission-planning problems with onboard missile systems. Using chat in the early stages allowed the boats to be groomed while on station and provided an easily accessible means of talking through problems.

NUWC's chat capability was also used in three Babylon Express fleet exercises, to provide 24/7 technical support and e-mail to nine boats. Full operational manning by NUWC subsystem experts supported the exercises in working both real and simulated problems, while allowing NUWC, TYCOMS, Theater Commanders, and platforms to train in using the capability and to exchange guidance prior to the conflict.

COMSUBLANT later requested that NUWC implement full 24/7 manning by all subsystem experts to support strike tasking for Operation Iraqi Freedom. NUWC subsequently offered engineering expertise on-line to assist deployed platforms in resolving strike capability issues rapidly. The Newport Division provided technical concurrence for onboard troubleshooting, reinforced procedural guidance, and by resolving technical issues, allowed at least six Tomahawk AURs to be placed back in ready status for strike use. As of April 4, 2003, NUWC had documented over 45 chat sessions with deployed platforms in the Area of Responsibility (AOR).

In addition to direct chat support, the Division's Submarine Status website at the Advanced Interactive Management Technology Center (AIMTC), **http://aimtc.nuwcnpt.navy.smil.mil**, was upgraded to support data retention of these chat-room support activities. Tomahawk Inventory Reports (TIRs), Indigo Firing Reports (IFRs), Casualty Reports, and related GENADMIN messages received by the NUWC DMS Message Center are automatically processed, entered into an AIMTC database, and displayed in a Tomahawk Scorecard that reports aggregate sums and individual status of all the Tomahawks onboard, launched, or failed, with dynamic links to retrieve history data for each missile and the IFRs. In addition to the scorecard, a chat-logger service continuously monitors and records the ongoing chat conversations, which can be accessed and searched from the Submarine Status website. Chat Summary Reports are submitted online following each session of NUWC technical support and can be searched by platform, ship class, or keyword from within the Submarine Status website as well. Any additional supporting material in a file format can be uploaded to the Submarine Status website to maximize data collection and retention.

Fleet feedback on the chat capability has been tremendous. The following comment from COMSUBLANT Strike is one of many positive reactions: "Overall, the support provided by NUWC in chat was outstanding. [It] not only solved problems but helped the crews better understand various casualties and information provided by the Fire Control System (FCS). The overall effect was a number of missiles that were either returned to operational status and shot or verified to be out of commission. Either case helped the Tomahawk Strike Coordinator (TSC) plan for future operations."

NUWC continues to provide the operational Fleet with timely, dynamic support and ready access to its in-house expertise. Newport Division's success in providing chat capability resulted from teamwork across the entire organization and is a source of great pride for all. Since the first phone call in October 2001, the NUWC team has provided outstanding support to Fleet operators by putting them only a chat away from the confidence they need to carry out their mission.

Robert Iriye is a Combat Control System (CCS) In-Service Engineering (ISE) Project Engineer, NUWC Division Newport

The NUWC Division Newport in-service engineering team works a fleet issue in the war room.

by JO3 Corwin Colbert, USN

Since its development in the 1930s, submariners have relied on the Oxygen Breathing Apparatus (OBA) to breathe in smoke-filled environments. With the phasing out of OBAs, submariners are breathing a collective sigh of relief with the new Self-Contained Breathing Apparatus (SCBA).

USS *Cheyenne* Submariners Welcome New Firefighting Gear

USS *Cheyenne* (SSN-773) is the fourth Pearl Harbor-based submarine to convert to the SCBA new breathing system. Members of the crew have welcomed the change.

"I think SCBAs are wonderful compared to the OBAs," said Machinist's Mate 2nd Class Jay Batista of *Cheyenne*'s Auxiliary Division. "They are more convenient and compartment-accessible."

OBAs are worn on the chest, and that causes problems for submariners crawling to avoid heat in smoke-filled spaces. They are harder to put on and more prone to snagging on shipboard objects than SCBAs. The SCBA's air cylinders are mounted on a harness and worn on the back, which improves weight distribution and maneuverability. In addition, SCBAs have audible and vibrating low-air alarms.

"SCBAs are more comfortable to wear and take a lot of weight off your shoulders. You can maneuver with a fire hose a lot easier, by using the over the shoulder method," Batista said. "Also, the OBA has breathing lungs, so if you put the hose under your arm you can puncture the lung," he said.

"That is the unique part of the SCBA. Instead of running to change out the oxygen-generating canister on your OBA, which takes about 15 minutes, you can recharge the SCBA inside a smoke-filled compartment in less than five," said Machinist's Mate 1st Class Tim Schreyer, the Auxiliary Division's leading petty officer.

There are 14 units onboard, plus 14 extra cylinders, in case refilling cannot be accomplished during an emergency.

Batista explained that the SCBA also has another advantage for use on submarines. "There's not a lot of space on the boat, and the SCBAs are more accessible and easier to store," he said. According to Batista, it took 11 days to replace the OBAs because modifications had to be made to the ship to accommodate the new gear. "It took a while because we had to change the high-pressure air pipes and put in recharging stations. We also had to take down all the old OBA lockers to put in new ones, and we did some welding to add brackets for the SCBAs," he noted.

Schreyer observed that by halfway through the install, the crew had been trained on how to wear and use the new firefighting gear. However, the Auxiliary Division had somewhat more to learn. "We got more training, because we are the ones who will be responsible for the system. We're going to be the ones performing maintenance on the equipment. We have to clean, disassemble, and repair them. The devices have an eight-year warranty, and some of the parts have a 15-year warranty," said Schreyer. "It's easier to perform maintenance on the SCBA, because – unlike the OBA – you don't have any moving parts that can break, and you don't have to change out any canisters," he said.

"To sum it up, it's convenient and state-of-the art," Batista concluded. OBAs have been used for a long time – well after civilian firefighters began using SCBAs. Finally, we have them too."

JO3 Colbert is assigned to COMSUBPAC Public Affairs

Submarine Veteran Epitomizes Service to Submarine Fleet

By JOC(SW/AW) Mark O. Piggott, USN

"For 45 years, he has epitomized the words accomplishment, professional, and patriot," said VADM Kirkland H. Donald, Commander Naval Submarine Forces. "We are losing a national treasure."

VADM Donald was speaking about Thomas R. Nutter, who retired in April after 45 years of service to the Navy and the nation. "Like so many others who served their country both as part of and in support of the submarine service," the admiral continued, "the public will never appreciate the debt of gratitude this nation owes you."

Nutter, a native of Henderson, West Virginia, began his long and varied career when he joined the Navy in May 1959. He attended the Electronics "Class-A" and submarine training schools until his first assignment onboard USS *Carp* (SS-338). His other submarine assignments included tours on USS *Argonaut* (SS-475), USS *Torsk* (SS-423), USS *Spadefish* (SSN-668), and USS *Cincinnati* (SSN-693). He retired from active duty as a Master Chief Petty Officer in June 1979, having served on both diesel-electric and nuclear-powered submarines.

In February 1980, he entered civilian federal service, accepting a position with the Naval Ship Systems Engineering Station, Philadelphia, Pennsylvania. After a year of specialized engineering and technical training, he was assigned to Commander, Submarine Squadron 8 as Technical Advisor for Submarine Masts, Antennas, and Periscopes, where he served until July 1985. He then accepted a position on the staff of the Commander, Submarine Force, U. S. Atlantic Fleet, where he has served as Special Programs Officer. "My biography lays out my career very succinctly," Nutter explained. "20-plus years active duty – all submarines; 24 years of federal service – all submarines. My wife often reminds me that I never left the Navy or the Submarine Force – I just changed uniforms along the way. My service has been both a privilege and a pleasure, and I can't think of a higher honor than being given the opportunity to serve one's country for over 45 years," he added.

Mr. Nutter is a graduate of Saint Leo College with a Bachelor of Arts degree in Business Administration and Computer Information Systems. He also holds a Masters of Business Administration in Technology Management from the University of Phoenix.

He has received numerous personal citations and awards, including the Navy Meritorious Civilian Award and Navy Superior Civilian Award. During his retirement ceremony, Nutter was presented the Distinguished Civilian Service Award by VADM Donald. The award cited Nutter as "an extraordinary champion of the taxpayer's money," noted that "his programs are consistent models of fiscal management," and lauded his "superb insight, leadership, managerial talent, technical expertise, and inexhaustible enthusiasm."

Despite all the formal awards and citations he has received, Nutter will be most remembered for his long service furnishing special-purpose gear and equipment – affectionately known as "Nutter Clutter" – to submarines for specific missions.

Retired Vice Admiral and former Submarine Force Commander John J. Grossenbacher noted, "No matter what it took, no matter the hours and despite the bureaucracy, Tom always found the people, the money, and the material to provide his precious 'Nutter Clutter' to our submarines.

"His years of work had a profound influence on submarine intelligence-collection, surveillance, and reconnaissance operations," Grossenbacher concluded. "They don't come any better than Tom, and he will be sorely missed."

"Submarines bring stealth, endurance, agility, and firepower to the battle space, and the silent service of the United States enjoys a noted dominance in the world today," VADM Donald added. "That accomplishment has been directly influenced by your extraordinary performance."

Nutter won't take all the credit for his dedication and years of service. Like any Sailor, past or present, he had a lot of support from home. "I didn't get here all by myself, I had a lot of help along the way," he explained. "I want to acknowledge a very special person in my life, my wife Marcella. She has been by my side all the way, and I do mean all the way." He continued, "She not only supported my work ethic, she made it possible for me to continue my education along the way. She is the perfect wife."

In a final tribute to Mr. Nutter's stature, VADM Donald quoted the words of Abraham Lincoln: "Character is like a tree and reputation like its shadow. The shadow is what we think of; the tree is the real thing."

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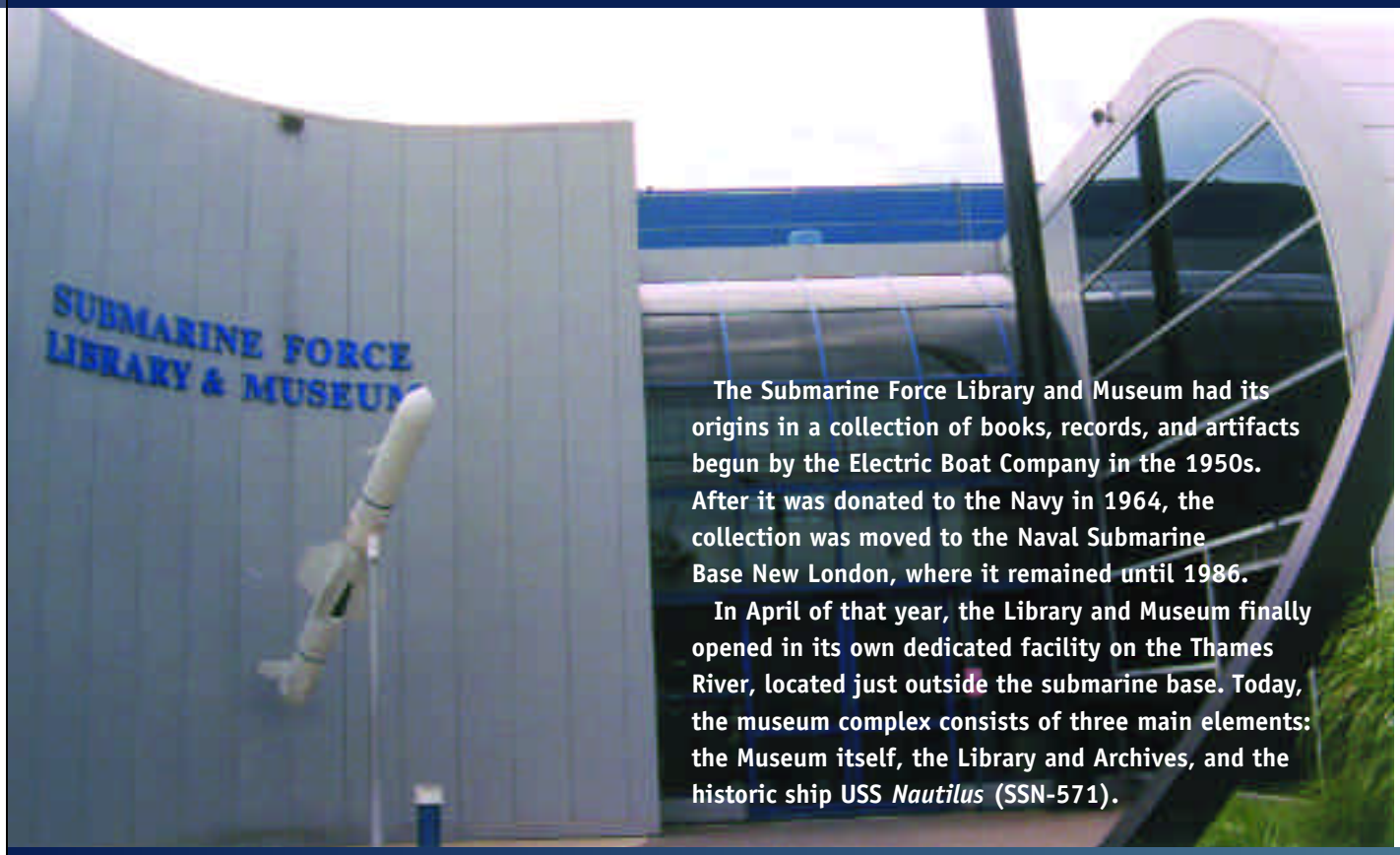
by Thomas Schoene



The Submarine Force Library and Museum had its origins in a collection of books, records, and artifacts begun by the Electric Boat Company in the 1950s. After it was donated to the Navy in 1964, the collection was moved to the Naval Submarine Base New London, where it remained until 1986.

In April of that year, the Library and Museum finally opened in its own dedicated facility on the Thames River, located just outside the submarine base. Today, the museum complex consists of three main elements: the Museum itself, the Library and Archives, and the historic ship USS *Nautilus* (SSN-571).

Visiting the SUBMARINE FORCE LIBRARY AND MUSEUM

The Museum

Arriving at the submarine museum, visitors first encounter a number of displays outside the main building itself. These set the stage for many of the exhibits inside and give the museum a venue for displaying many items that simply will not fit elsewhere.

The most prominent of these outdoor displays is the complete sail from USS *George Washington* (SSBN-598), which stands in front of a monument dedicated to the Polaris program and the first "41 for Freedom" ballistic-missile submarines. Together with the nearby top section of a Polaris launch tube, complete with open hatch and missile cover, it forms an impressive remembrance of our earliest seaborne nuclear deterrent.

The unique entryway of the Submarine Force Museum consists of a large 40-foot outer ring – representing the hull diameter of an *Ohio*-class SSBN – and a nine-foot inner counterpart that contrasts the hull diameter of the U.S. Navy's first submarine, USS *Holland* (SS-1), commissioned in 1900.

Four unusual mini-submarines and submersibles are arrayed next to the entrance:
• *HA-8*, a Japanese Type-A mini-submarine. Five craft of this design participated in the Japanese attack on Pearl Harbor.
• *X-1*, the US Navy's first midget submarine design, built in 1955 to test U.S. defenses against enemy counterparts. Originally powered by an experimental hydrogen-peroxide propulsion system, *X-1* was converted to conventional propulsion after a 1957 explosion destroyed much of her original bow.
• A Mk VII Swimmer Delivery Vehicle (SDV), an early U.S. Navy design now replaced by larger and more sophisticated versions.
• An Italian "chariot," or swimmer delivery vehicle, similar to the *maiale* ("pig") types used to attack British ships during World War II.

Rounding out the collection is a World War II submarine deck gun from USS *Piranha* (SS-389) and several other artifacts.

To enter the museum building, visitors pass through an interesting archway. A ring 40 feet in diameter represents the hull diameter of an *Ohio*-class SSBN. Suspended inside is a 9-foot ring marking the diameter of USS *Holland* (SS-1), the Navy's first submarine. This provides a striking reminder of the dramatic advances achieved in submarine technology since 1900, when *Holland* was commissioned.

Once inside, the first thing a visitor sees is an earlier *Nautilus* – not a real submarine, but the version imagined by Jules Verne in his novel *Twenty Thousand Leagues Under the Sea*. A model of the submarine created for the 1954 Walt Disney movie of Verne's classic hangs in the entryway. Nearby there are two hands-on exhibits ideal for younger visitors – a replica of a World War II submarine attack center, complete with functioning periscopes, and a submarine control room.

One wing of the museum deals primarily with modern submarines. Exhibits focus on the strategic deterrence program, including Polaris, the former submarine base at Holy Loch, Scotland, and similar aspects. There is also a cutaway model of a USS *Los Angeles* (SSN-688)-class submarine and a display on submarine contributions to Operation Desert Storm and other recent conflicts.

The other wing houses several large-scale historical displays, beginning with a replica of the first combat submersible, *Turtle*, from the Revolutionary War. Associated exhibits describe the evolution of submarines over the centuries. The contrast between the crude hand-cranked *Turtle* and modern submarines is striking, yet both had the same goal – to seek out and destroy the nation's enemies.

In addition to *Turtle*, a McCann Rescue Bell dominates this section of the museum, and there is also a small exhibit on the 1939 rescue of crewmembers from the stricken USS *Squalus* (SS-192), which made the McCann bell famous.

Much of the remaining space is dedicated to Submarine Force achievements in World War II. A cutaway model of a USS *Gato* (SS-212)-class submarine hangs over the area, helping visitors to appreciate how little space was available onboard these vessels. (It is interesting to compare this wartime submarine with *Nautilus*, only a decade later. While the basic configuration is much the same, nuclear power was clearly a great improvement for crew habitability, as well as submarine performance.) Other exhibits describe both combat operations and life onboard wartime submarines. Rotating displays of historical artifacts from the museum's archives honor individual boats. These displays are often arranged to coincide with crew reunions or other events at the museum.

Finally, one wall is dedicated to submarine armament. There are a number of torpedoes and other submarine weapons, ranging from a 1918 Whitehead design to the modern Mk 48 and a SUBROC rocket-propelled nuclear depth charge. As an adjunct to the many other displays on SSBNs and strategic deterrence, there is a demilitarized Polaris missile on hand, sectioned to show the complexity of its internal workings.

As visitors head out of the museum building toward *Nautilus*, they pass a wall of models, representing every class of U.S. submarines from *Holland* to USS *Seawolf* (SSN- 21).

(above) The wardroom onboard USS *Nautilus* (SSN-571) is displayed behind a plexiglass partition for visitors to the historic ship.

(left) Suspended just inside the museum's entrance is a large-scale model of Captain Nemo's fictional *Nautilus*, created for the 1954 Walt Disney film of Jules Verne's *Twenty-Thousand Leagues Under the Sea*.

The centerpiece of the Submarine Force Museum is the decommissioned USS *Nautilus* (SSN-571), the world's first nuclear submarine. Commissioned in late 1954, she served until 1980 and after deactivation of her reactor, was opened to the public in April 1986. *Nautilus* remains afloat in the Thames River but moored to the museum pier with a set of articulating brackets. She was briefly overhauled in 2002 and still serves the Submarine School as a training aid.

Historic Ship *Nautilus*

Adjacent to the main building, the centerpiece of the museum's collection – USS *Nautilus* (SSN-571) – is moored in the Thames River. The world's first nuclear-powered submarine – indeed, the world's first nuclear-powered ship of any sort – *Nautilus* marked a major revolution in submarine technology, and with her, submarines became truly independent of the ocean's surface. Commissioned in September 1954, *Nautilus* rapidly proved the value of nuclear propulsion, setting a number of speed and endurance records and revolutionizing submarine tactics. The famous signal, "Nautilus 90-North," cemented the submarine's place in the popular imagination, when she became the first ship to sail directly over the North Pole. *Nautilus* served a distinguished 25-year career as a warship, while also testing equipment and technology for her successors.

Five years after *Nautilus* decommissioned in 1980, she was towed to Groton and became part of the Submarine Force Museum when it opened to the public in April 1986. (In 2002, *Nautilus* was briefly removed from the museum for an overhaul at Electric Boat, where she was originally built, but has since returned). The boat is firmly moored to the pier by a set of articulating brackets, but she remains afloat and is maintained in excellent condition.

The only U.S. nuclear-powered submarine currently on public display, *Nautilus* gives visitors a remarkable glimpse of history and naval technology. The ship is preserved in nearly the same condition she was in during her active life, quite impressive for a ship nearly 50 years old. Selected portions of the forward section of the submarine – the torpedo room, wardroom, control room, attack center, crew's mess, and several other areas – are open to the public, with a self-guided audio tour available. The audio tour describes each space as guests walk and climb through the submarine. The route is delimited by clear partitions that protect the ship from the wear and tear of passing hands (and vice versa, perhaps).

The (aft) engineering half of the submarine is preserved in similar condition; the machinery is still in place, though the reactor has, of course, been defueled. Since submarine nuclear propulsion technology, even *Nautilus'*, could aid a country that does not have high speed, long distance submersibles (which only nuclear propulsion can provide), this section is not accessible to civilians, but Submarine School students visit regularly to gain a better understanding of the history of the systems they operate. Although technical details have changed, modern nuclear submarines operate on the same basic principles established onboard *Nautilus* nearly 50 years ago.

The Library

As important as the museum itself, the Submarine Force Library plays a major role in educating both the public at large and members of the submarine community about the history and traditions of the force.

Electric Boat began the library as a resource for its designers and engineers with the ambitious goal of gathering every available publication related to submarines. The collection eventually outgrew its original home at Electric Boat, but rather than disposing of it, EB donated it to the Navy, which relocated it to the

submarine base. The Navy has continued to maintain and expand the library's holdings until it is now the single largest collection of material related to U.S. Navy submarines outside of Washington, DC.

The library currently maintains historical files for each individual submarine in the U.S. Navy, past and present. It also has an extensive collection of books, periodicals, news clippings, and photographs about the Submarine Force in general. The library holds an extensive oral history collection, including accounts collected by both the U.S. Naval Institute and the library itself.

The mission of the Submarine Force Library and Museum is to preserve the rich heritage of the U.S. submarine community for future generations.

The library's unique collection makes it an invaluable resource for historical research. Users range from private individuals, often researching the history of family members who served on submarines, to academics preparing books or papers, to students at the Submarine School. Each basic enlisted class researches a specific submarine using the library's resources, thus emphasizing the living connection between past, present, and future submariners.

Plans for the Future

Since it opened in 1986, the museum has seen significant changes, including the addition of a new wing in 2000. And, of course, additional enhancements are always in the works.

The museum's director (and *Nautilus* Officer-in-Charge), LCDR Frank Sides, hopes to add one of the Deep Submergence Rescue Vessels, possibly *Mystic* (DSRV-1), to the outdoor display, when the DSRV is replaced by a planned next-generation submarine rescue system.

Archivist Wendy Gully said the library plans to expand its oral history efforts to ensure that the memories and experiences of submarine veterans are passed on to future generations of submariners and historians. The library also hopes to increase the exploitation of its resources by Submarine School classes, and one concept under discussion is for each officer class passing through the school to research one of the eight Submarine Force Medal of Honor winners.

But whatever the future brings, the Submarine Force Library and Museum will continue its mission of preserving the rich heritage of the U.S. submarine community for future generations.

Mr. Schoene is a naval analyst and writer living in Arlington, Virginia. He has previously written for the U.S. Naval Institute *Proceedings* and *Naval Forces* magazine.

The Submarine Memorial

Located just two miles south of the Submarine Force Museum is another noteworthy site, the National Submarine Memorial – East, maintained by the United States Submarine Veterans of World War Two. (A west-coast counterpart is located in Seal Beach, California.)

Although not officially connected to the Submarine Force Museum, the memorial complements the museum's mission of reminding the public about the historic role of the Submarine Force. The monument is dedicated to submarines and submariners still "on final patrol" from World War II. Its focal point is the conning tower from USS *Flasher* (SS-249), which held the record for most tonnage sunk by a submarine during the war.

Decorative stones surrounding the conning tower list the 52 U.S. submarines lost during that conflict, giving the date and circumstances, where these are known. A black granite memorial wall lists the names of the 3,617 submariners killed in the war, a stark reminder of their sacrifice.

(clockwise from top)

Displayed outdoors is this Japanese Type-A mini-submarine of the type that took part in the attack on Pearl Harbor, 7 December 1941.

Also part of the outdoor exhibit is this Mk VII Swimmer Delivery Vehicle, used by U.S. Navy SEALS until replaced by larger and more sophisticated versions.

X-1, the first U.S. Navy mini-submarine, was built in 1955 both to investigate defenses against foreign counterparts and to demonstrate an experimental hydrogen-peroxide propulsion system – which exploded two years later.

by Katie Eberling

Photo by Brian Nokell, NSB Bangor Visual Information

A Quiet *Kentucky* RETURNS TO PATROL

Near the end of an unusually long refit necessitated by major repairs to her fairwater planes, USS *Kentucky* (SSBN-737) has her starboard plane reinstalled at IMF Bangor. Accomplished while the ship was afloat, this delicate evolution required skillful coordination among crane operators, riggers, and the entire waterfront crew.

After spending more than nine weeks in an unusually complex refit, USS *Kentucky* (SSBN-737) slipped confidently into the open waters of Hood Canal on 19 April in preparation for her next patrol. With 100,000 production man-hours executed in the completion of more than 1,000 individual jobs, her refit was a first-ever demonstration of a new surge maintenance capability in the Pacific Northwest.

The Naval Intermediate Maintenance Facility (IMF) at Naval Submarine Base, Bangor, knew early-on that the normal refit period of four weeks would be insufficient to perform all the repairs and refurbishments needed by *Kentucky*. The ship had previously reported noise in the fairwater planes while underway and had asked the IMF to consider what repair options might be available when she returned from patrol.

Because the ship was already operating outside of her fairwater plane specifications on a temporary waiver, and since one of the planes appeared to be out of alignment, it was determined that both planes would have to be removed for inspection and repair. Although TRIDENT Refit Facility (TRF) Kings Bay had already performed temporary repairs on the stock and hubs for *Kentucky* 's fairwater planes while

she was homeported on the East Coast, both the Fleet and the IMF decided that it was time to examine alternatives for a permanent fix.

When the ship docked on 12 February, IMF immediately disassembled both fairwater planes and discovered that saltwater intrusion and significant corrosion had caused serious deterioration in their material and operational condition.

Fairwater planes are horizontally disposed control surfaces – "wings" – mounted on the sail for controlling the ship's angle of rise or dive while submerged and underway. Given the importance of keeping them in peak condition and operating quietly, IMF considered several options. The principal concerns were safety and cost control. Although IMF has been accomplishing depot-level repairs and refurbishment on major components of the TRIDENT submarines for years – replacing main propulsion shafts and overhauling SSTGs and SSMGs, for example – they had never completely disassembled submarine fairwater planes. This type of work would normally be undertaken by the Naval Shipyards, but given the constant use of their drydocks and the consequent necessity of a long shipyard availability, the operating schedule of the submarine would have been compromised. Moreover, the rapid deterioration of *Kentucky*'s fairwater planes demanded an early solution.

According to CDR John Baldwin, IMF Production Management Assistant (PMA), and head of the project, a team of engineers, planners, machinists, and other shop leaders from the IMF, Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS&IMF), Naval Sea Systems Command (NAVSEA), and Electric Boat pulled together to consider repair options. "This was a major team effort by nearly everyone involved in ship maintenance to apply the One Shipyard concept to resolve a maintenance issue for the Navy," said Baldwin. "Once we got in there and saw the extent of the damage, it became clear that we were going to have to rethink completely the way the repair was going to take place in order to get the ship back to sea quickly. The IMF had a window of opportunity in its maintenance schedule for other in-port submarines and potentially could perform permanent repairs during the *Kentucky*'s upcoming scheduled refit," he added.

The team determined that there were essentially three options. The first – which would leave the ship's schedule unchanged – was to perform another temporary repair, reassemble the planes with their existing deficiencies, and defer the permanent repair until the ship went into a major shipyard overhaul. However, because there was no guarantee that this approach would correct the problem, and the life expectancy of the temporary fix was unknown, it was considered the highest-risk alternative, even though it could have been accomplished during a normal refit and at low cost.

The second option was to send the planes and stock back to Newport News Shipbuilding, which had conducted similar repairs in the past for other submarines homeported at Kings Bay. Given the size and weight of the components, this would have been extremely expensive and time consuming. The fairplane stock – essentially the horizontal axle for rotating the planes – weighs 13,600 pounds, and each plane alone weighs about 25,800 pounds. The latter, when standing vertically, are 17 feet high by 15 feet wide, which precluded shipping them by air. Even if specially-configured trucks could deliver them to the East Coast, Newport News was extremely busy at the time and unable to complete the job in the narrow window available.

The third option – the one ultimately selected – was to do the job in-house at the IMF, with significant participation by a large Navy-contractor team. This approach ended up breaking new ground, not only among the maintenance providers in the Pacific Northwest, but Navy-wide. Secretary of the Navy Gordon England has said that the common thread of his initiatives over the last three years has been to improve the management and efficiency of our naval forces. Within the maintenance community, a Transformation Plan has been in progress to subsume all maintenance activities into a "One Shipyard" concept in order to gain greater efficiencies and effectiveness in serving the fleet. *Kentucky* was an early beneficiary, and ultimately her design integrity was restored, and her operational schedule maintained.

The plan incorporated the ideas and best practices from a number of contributors, including the IMF, PSNS&IMF, NAVSEA, and private contractors. The highly complex job was made even more difficult by the need for significant welding on the fairplane stock, an HY (High Yield) 100 alloy forging for which the Navy had no approved welding procedures. Additionally, there were complex metallurgic issues and the requirement for a very large lathe for final machining.

"The IMF proposed a plan for the repairs we intended to conduct and the technical methods and procedures we would carry out. Then, as the Navy's technical authority, NAVSEA 07T had to evaluate them and provide concurrence," said CDR Baldwin. "In addition, we needed to work with Commander, Submarine Squadron 17 (CSS-17), Commander, Submarine Group 9 (COMSUBGRU-9), and Commander Submarines Pacific Fleet (COMSUBPAC) to assure them that not only could we complete the repairs in a timely manner, but also that the end result would pass all tests and meet operational

Photo by John Woodmansee, NSB Bangor Visual Information

A mechanic stamps the weight limit and test date on the Navy's first vertical fairwater plane stand, fabricated in-house at IMF Bangor.

specifications," he concluded. This became the first-ever repair outside a shipyard on components that are not normally even addressed during a major two-year overhaul. Moreover, IMF had no authoritative source documents or procedures to accomplish the work.

"The lead engineer for ship control systems, Mark Mosely, developed a detailed checklist of required measurements and troubleshooting steps for our shops when the ship first arrived for refit," said Rob Bay, IMF's Chief Engineer. "Working through a weekend, he and the mechanics assembled data on the planes in order to define the job. After the planes were removed by the riggers, crane operators, and the outside repair shop, we discovered not only serious water intrusion and corrosion, but also that the ship's initial analysis was correct – the planes were out of alignment. It was worse than we feared," he said.

With assistance from NAVSEA, Mosely researched past Navy experience with the problem and reviewed all the options and their potential impacts in formulating a plan for the repair. "Normally, nothing gets done in the maintenance world without technical direction," said Mosely. "We ended up having to write the rules and deciding on the direction we would take after consulting other Naval Shipyards and private yards," he added.

After COMSUBPAC granted a five-week extension to the normal refit period – having adjusted other SSBN schedules accordingly – and NAVSEA authorized PSNS&IMF to write a procedure and perform the necessary welds on the HY100 stock, the plan took shape. The final element was to bring on site a private contractor capable of performing the highly-specialized, large-scale machining needed on both the planes and the stock in the time available.


Photo by John Woodmansee, NSB Bangor Visual Information

"Due to the extended time *Kentucky* was in for refit, we were now able to perform nearly twice the number of normal jobs," said Baldwin. "We pulled in a lot of maintenance planned for upcoming refits to take advantage of her longer availability, thus reducing the amount of work we'd need to do later," he noted.

In addition to Mosely's expert analysis, intensive coordination and first-rate communication skills were required to orchestrate the symphony of unique and complex jobs that then began simultaneously among the IMF, PSNS&IMF, and the contractors.

The severely-damaged fairplane stock, tapered at both ends, was sent to PSNS&IMF in Bremerton for their expert craftsmen to perform the challenging HY100 welding and machining. Using advanced welding techniques, they built up the conical surfaces of the stock to replace the damaged material and allow re-machining of the taper to its original specifications. The PSNS&IMF engineers wrote the new procedures while the work was being performed and then conducted special inspections and testing. With more than 1,250 production man-hours on the job, and working around the clock for three weeks, the stock was returned to IMF four days ahead of schedule.

"The welding work performed by the PSNS&IMF craftsmen was phenomenal," said Baldwin. "It was absolutely flawless, and its precision and quality enabled the contractor and the IMF to progress more rapidly on other work for the project," he added.

In Place Machining Company (IPM), a Milwaukee, Wisconsin contractor hired on short notice for the job, had became known to the IMF because of their previous repair work on the rudder of USS *Abraham Lincoln* (CVN-72). The IMF planners brought IPM on-site to machine down the planes, stock, hubs, and keyways to the original design specifications. After their engineers designed and built a vertical boring machine to accommodate the planes' unique internal taper, it was then shipped to the IMF with a portable lathe that could handle the swing of the stock, since a suitable machine tool was not available at either Bremerton or Bangor.

But before any work could be done on the planes, the engineers had to design a pair of stands to hold the massive components vertically so gravity wouldn't pull the borer off center while they were being machined. "The challenge for the stands was to come up with a design in a limited amount of time using material that was

The Northwest Regional Maintenance Center

As a direct result of CNO initiatives to streamline maintenance activities and reduce costs, the Northwest Regional Maintenance Center was stood up on 20 May 2003. An earlier consolidation plan provided the framework for integrating all Navy maintenance facilities in the region, and the resulting single activity is responsible for planning, execution, and oversight of all Navy vessel maintenance in the Northwest.

The Puget Sound maintenance facility comprises Puget Sound Naval Shipyard, Intermediate Maintenance Facility, Supervisor of Shipbuilding, Fleet Technical Support Center Pacific Detachment Everett, and portions of the Naval Surface Group PNW maintenance staff.

(opposite page) An apprentice welder assists in fashioning a massive steel cradle needed to hold the dismounted fairwater planes perfectly vertical while the hubs were re-bored from above.

(left) The removal of the fairwater planes from USS *Kentucky* (SSBN-727) revealed not only serious corrosion on the planes' hubs and stock, but also significant misalignment of the port and starboard planes themselves.

(right) In preparation for one of a series of fit checks, IMF Bangor riggers shift the newly-machined plane stock from a portable lathe supplied by In Place Machining (IPM) to a refurbished fairwater plane located outside the shop. The plane stock weighs nearly seven tons, and the fairwater planes nearly 13 tons each.

Photo by Brian Nokell, NSB Bangor Visual Information

Photo by Katie Eberling, IMFACPACNW

available or could be purchased quickly," said Marly Galindo, engineer and designer of the Navy's first-ever vertical plane stand. "The concept was to land each plane on a bottom framework and hold the planes vertical with four pendants," he continued. The IMF machinists then had to manufacture the stands quickly in preparation for the riggers' expert placement of the planes inside.

Once PSNS&IMF returned the stock to IMF, machinists from both the IMF and IPM immediately went to work. "Their technical performance, response, and coordination were superb," said Baldwin. "We needed to compress the schedule as much as possible, and IPM's ability to fly in with their equipment and expertise was crucial in delivering the ship on time," he added. IMF had prepared for them ahead of time by making space on an already crowded production floor and had also wrapped the planes, which were staged outside, in plastic sheeting to allow the machinists and welders to work around the clock in all weather.

It was particularly crucial to machine the taper of the stock accurately enough to ensure sufficient clearance between the planes and their roots on the submarine sail when finally installed. After several test fittings and fine adjustments, the drawkeys that hold the planes in place were repaired and reinstalled for final measurements. Minimum engineering requirements are to achieve at least 75 percent contact between the surface of the stock and the internal bore of the planes. The team effort of PSNS&IMF, IMF, and IPM significantly exceeded that standard.

"With the work on the planes as the pacing item for the SSBN-737 refit, IMF had to complete the equivalent of two refits on her while accomplishing all the jobs on three other in-port submarines," said CDR Dave Wilkie, IMF Executive Officer. "It would have been difficult to finish all of this on schedule without help from the PSNS&IMF workforce," he added. As a result of the 15 May 2003 merger of the two activities, it became much easier to share workers to accommodate surges in maintenance requirements.

The ship's crew wasn't off the hook though. "They had many work-control responsibilities to get the ship prepared and tagged out, as well as performing preservation work in the sail and throughout the boat," said LCDR Matt Feehan, IMF Machinery Division Officer. "They provided excellent support and met very rigorous work-control requirements," he added. "Then, when the ship was put back together, they had a significant effort to test everything and prove out all the work," he concluded.

Managing such a technically complex and sophisticated refit, involving more than 1,000 jobs by multiple organizations and work sites, presents its challenges. Intricate coordination and sequencing of work packages were key, with much of that responsibility on the shoulders of Tony Avila, IMF Outside Repair Supervisor. Communication issues evaporated as people shared the pride of accomplishing something new by capitalizing on the expertise available in our new "One Shipyard" and adopting the best practices from throughout the Navy and private industry.

The whole IMF, from the administrative and repair departments to the waterfront, achieved this milestone – with superb support from the Fleet and Industrial Supply Center. But none of this could have happened without the partnerships forged with PSNS&IMF and IPM. "The teamwork has been spectacular, and that has been one of the biggest benefits of this entire effort," said CDR Baldwin. "We made a lot of progress on this project in solidifying long-range consolidation," he added.

"From the riggers to the welders, shipwrights, engineers, and planners, everyone worked towards the single goal of restoring a strategic asset to maximum operational availability in an astonishingly short amount of time," said CAPT Hal Barge, IMF's Commanding Officer. "There were some skeptics out there who didn't think it was possible, but by applying many of the concepts of the CNO's Transformation Plan we did it," he added.

As if there weren't enough challenges during the refit, a final task emerged as one of the trickiest. Since *Kentucky* had been moved from the drydock, re-installation of the planes had to be performed while she was afloat. "Tide, current, and wind determine the parameters for a safe evolution," said Ed Bird, Outside Repair Foreman, "and our tidal range gives us just two opportunities each day for them to come together. We needed the ship to be sitting as high and as still in the water as possible, and the large sail area of the planes meant we couldn't take too much wind. But everything went off well due to the superb skills we have on the waterfront."

As a direct result of being willing to approach a difficult problem by "thinking out of the box," the Navy saved more than $700,000 on the *Kentucky* repair and shortened the period the ship was off-line by 14 weeks. The timely return of *Kentucky* to sea will become the model for rapidly restoring operational availability in light of today's demanding surge requirements.

Katie Eberling is the Command Information Officer for Naval Intermediate Maintenance Facility, Pacific Northwest

by Bob Althage

"It's a hostile environment. Our job is to keep us at the forefront of undersea warfare."

ACOUSTIC INTELLIGENCE:

Charting the Undersea Frontier

In the Acoustics Intelligence Laboratory at the Office of Naval Intelligence (ONI), STSCM(SS) Tim Hella and a small cadre of colleagues are charting the elusive sound prints of the still-mysterious ocean frontier.

From their work has come an ever-expanding body of knowledge from which new naval tactics and technologies are derived.

The information developed by these specialists enables sonar technicians in the fleet to sort through tens of thousands of possible contacts and identify friend from foe.

"ACINT (acoustics intelligence) is as much an art as a science," says STSCM(SS) Gerald A. Behnken, ONI Acoustic Intelligence Specialist.

Since the ACINT Specialist Program was born out of Cold War necessity in 1962, only a few individuals have been selected to carry out the critical mission. Currently there are just 49 qualified specialists, 39 submariners and 10 surface warriors. All are volunteers, and each brings years of sonar experience to the job. Virtually all of them joined acoustics intelligence as an E-6 or above. Their most common shared characteristic however, is their desire to excel.

"This is such a competitive bunch of guys. We all try to outdo one another," Behnken says. Hella amplifies. "Imagine getting every 'Type-A' person you ever knew into one small room."

Typically, qualifying to become an ACINT specialist takes 16 to 18 months. Candidates are handpicked from the most capable submarine and surface Sonar Technicians in the fleet. The intensive training is not a formal school, but a selective, self-paced course of study coupled with formal qualification checkouts, on-the-job training, briefings, practical examinations, and time at sea under the supervision of a qualified ACINT specialist.

"If you want to be a Sonar Technician, this is the place to be. This is where the action is," says STSC(SS) Arthur D. Pistorio, who, at about the half-way mark in ACINT specialist training, has found new meaning to the word "rigor." It's the most challenging thing I've ever done. It's very difficult. A lot of hours. An amazing amount to learn."

Additionally, each trainee is required to demonstrate his knowledge before a qualification board mid-way through the course and at its completion. "The pressure was amazing. When I walked out of my interim qual board I was so relieved," Pistorio said.

ACINT Specialist STSC(SS) Allen Sanders receives environmental data for a sonar search plan update while underway.

Eventually, each candidate who qualifies as an ACINT specialist will play an important part, along with ONI civilian analysts, in assembling and maintaining a voluminous acoustics intelligence database. ACINT data must be collected and analyzed over many years.

At sea, the threat contact must first be acquired on sonar. An ACINT specialist is able to quickly determine the general type of vessel (submarine, surface warship, merchant vessel, trawler or torpedo). More time and analysis are needed to make a specific identification. If it is classified as a contact of interest, the data collected on it is forwarded to ONI. In order to classify to a specific vessel or hull number, other types of collateral information are required to narrow the possibilities.

ACINT specialists support a wide variety of training programs to **prepare students for the challenges ahead**.

The assembled acoustic database serves numerous important purposes. ACINT data help identify threat acoustic vulnerabilities; vulnerabilities which may be exploited by new sensors, processors and displays. The improved detection capabilities are refined in exercises, which eventually become new tactical doctrine.

Despite the expanding array of sophisticated technology and tactics, it is still the ears and the minds of the specialists that are the final determiners of good ACINT. "The human factor is still necessary. That's what makes it so interesting," Hella says. ONI's ACINT specialists are deeply involved in fleet training, devoting many hours to formal instruction in such topics as acoustic analysis and the importance of sound silencing for the SONAR division, the wardroom, and the crew.

"Their real importance is that they're authoritative data guys," says CAPT Arnold O. Lotring, Commanding Officer, Submarine Learning Center, in Groton, Conn. "They back up the database with vast experience. Any database can degrade. These people keep it alive with their experience." An ONI ACINT specialist serves on the instructional staff at the new Submarine Learning Center.

ACINT specialists support a wide variety of training programs to prepare students for the challenges ahead. They tune acoustic training programs and technical systems for attack team trainers to replicate actual threat contacts. At sea, ACINT specialists direct on-watch OJT, passing years of sonar experience on to junior petty officers.

"ACINT specialists are an integral part of bringing the crew up to the highest levels of preparedness and training," Lotring says. "Underway they are critically important to the mission's success. Not only on the sonar side, but to the commanding officer and the wardroom."

Should he qualify, what can Chief Pistorio look forward to? Challenging work, the comradeship of a select group of individuals with a keen sense of legacy, and a lot of time at sea.

Although the ACINT program is not considered traditional sea duty, specialists spend nearly half of every year at sea. During the 16 to 18 month training period, aspiring specialists typically take part in three to four submarine missions. After qualification, they average two to three missions per year.

"When you look at the sea time that they put in, they do take it to another level," Lotring says. "I wish we had more communities that have that kind of personal pride and dedication."

Although the Cold War has ended, and with it the primary mission of collecting acoustic intelligence on Soviet ocean platforms, ONI ACINT specialists have nimbly responded to challenging naval worldwide operational priorities, such as the Global War on Terrorism.

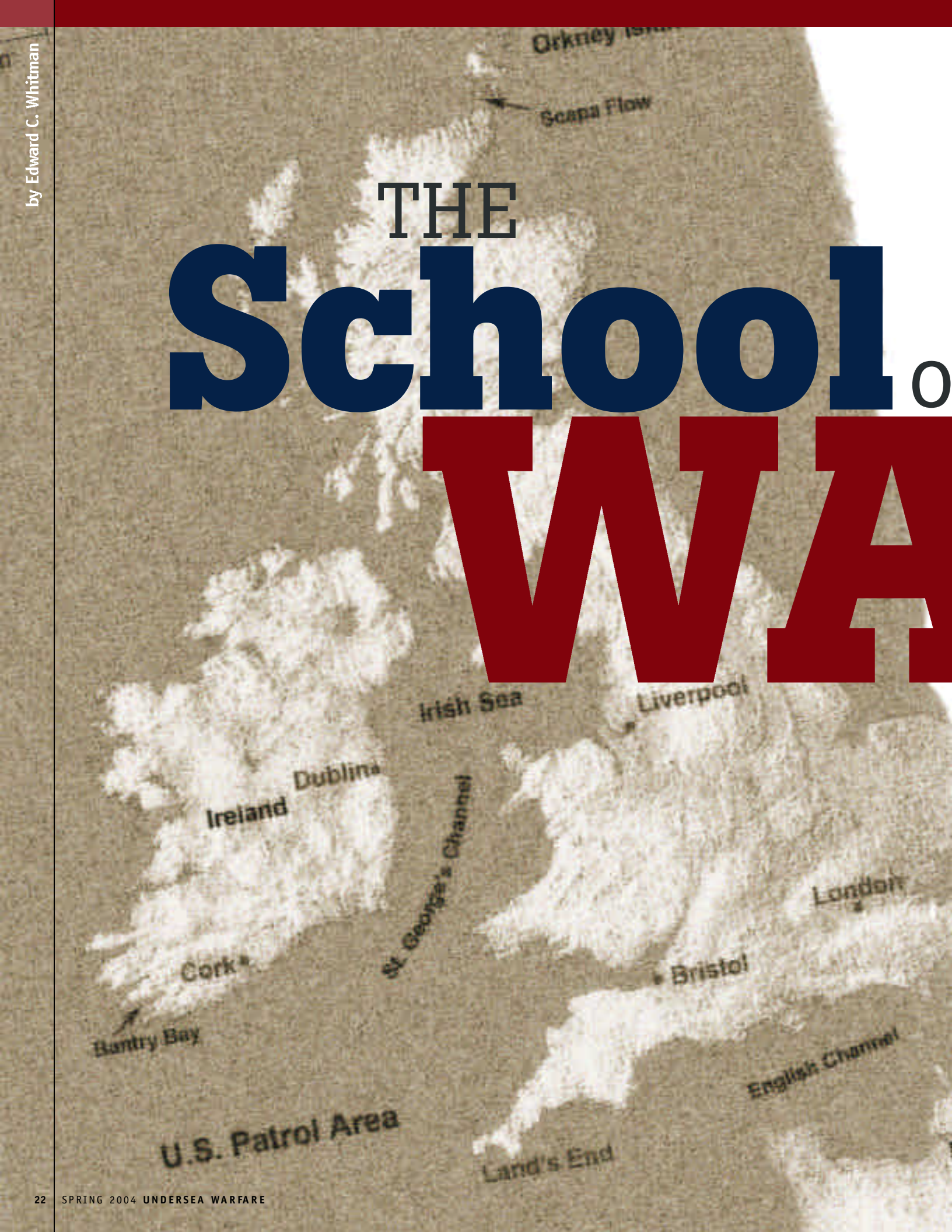
Despite these changes, ACINT specialists consider one principle to be immutable: a commitment to delivering the highest quality service to the fleet.

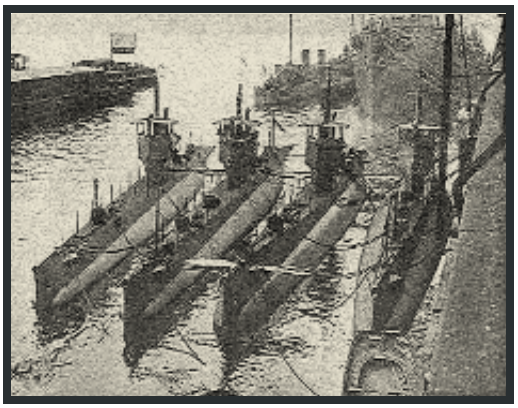
"When you leave the boat, you've made your mark," Behnken says. "You've passed on something of value."

Mr. Althage is the Public Affairs Officer at the Office of Naval Intelligence.

by Edward C. Whitman

THE School o WA





U.S. Navy Photo

The first U.S. submarines to arrive in European waters were USS *K-1, K-2, K-5,* and *K-6*, which reached the Azores in October 1917. They are shown here moored alongside their tender, USS *Bushnell* (AS-2), at Punta Delgada, Azores late that year. (*Bushnell* later transferred to Bantry Bay, Ireland, to tend L-class submarines there. She was replaced at Punta Delgada by USS *Tonapah* (BM-8).)

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U.S. Submarines in World War I

Despite ineffectual attempts by both the Russian and Japanese navies during the Russo-Japanese War (1904–1905) to employ "submarine torpedo boats" in Far Eastern waters, modern submarines received their first real baptism of fire in World War I (1914–1918). Even with the global proliferation of submarines during the first few years of the 20th century, it was the Germans and British who first demonstrated their dangerous potential for undersea warfare in the Atlantic and Mediterranean during 1914 and 1915. In acquiring John Holland's pioneering Holland VI – the progenitor of all "modern" submarines – in 1900, the U.S. Navy had gained a small head start on its European counterparts. But by the time the United States joined the Allied cause in mid-1917, rapid technical and operational developments in Europe – and particularly during the early years of the war – had left the U.S. submarine force significantly outclassed.

(above) The first L-class boats arrived at Berehaven, Ireland in late January 1918. Under the tutelage of the Royal Navy, they were soon conducting anti-submarine patrols south and east of Bantry Bay and served in that capacity until the end of the war in November. Here, USS *L-1* and *L-3* are tied up alongside *Bushnell*.

(right) Late in World War I, the seven U.S. L-class submarines of SUBDIV 5 were transferred to Bantry Bay, Ireland to carry out anti-submarine patrols in an area of responsibility that included St. George's Channel and the western approaches to the English Channel. Several American battleships were also stationed at Bantry Bay, and an entire division of them formed the 6th Battle Squadron of the British Grand Fleet at Scapa Flow in the Orkney Islands.

When World War I broke out among the European powers in early August 1914, the U.S. Navy had 29 submarines in commission. These ranged from the immediate successors of *Holland VI* – eight A- and B-class boats in the Philippine Islands – to the first two members of the K class, which had just entered service. When Germany's unrestricted submarine warfare campaign and the infamous Zimmerman telegram[1] finally drew the United States into the war in April 1917, the Navy had 42 submarines in commission, having added the remainder of the K class (for a total of eight) and seven of the newer L-class boats (of an eventual 11). But even the best of these had only been intended for harbor or coastal defense, with surface displacements of around 450 tons on a length of 165 feet – and capable of only 3,000-mile endurance at 11 knots, barely enough to cross the Atlantic. By then, the succeeding N and O classes were already under construction, with the 27-ship R class soon to follow, but only the three large "fleet boats" of the T class – laid down in 1916 and 1917 – offered true ocean-going potential, and they would not be joining the fleet until well after the Armistice.

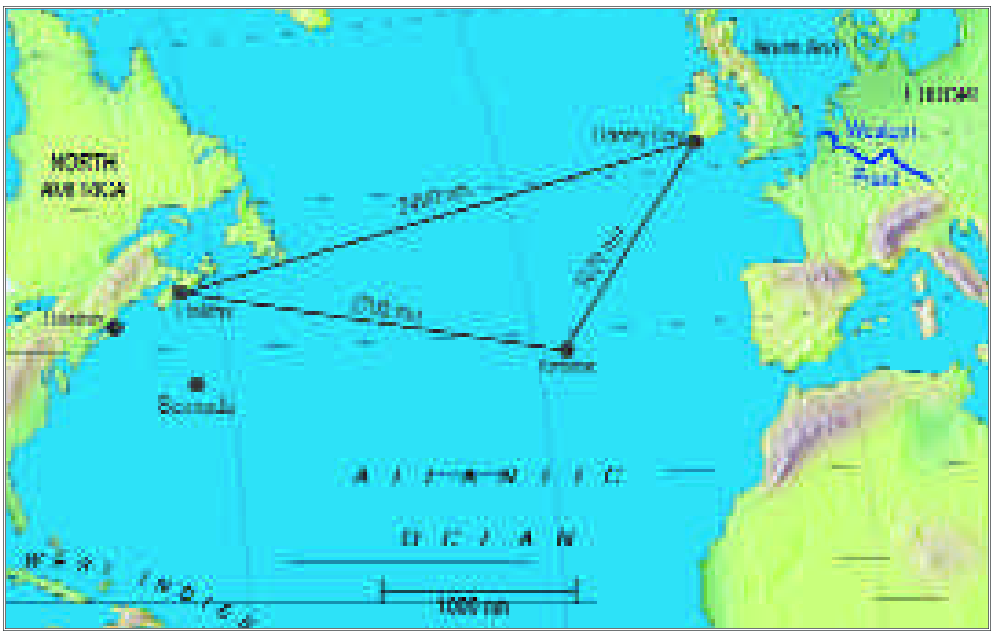
First U.S. Submarines to Europe

Nonetheless, because the Royal Navy in 1916 had begun assigning submarines to anti-U-boat patrols in the North Sea, the English Channel, and the Irish Sea, the U.S. naval high command in June 1917 proposed sending a contingent of submarines to European waters to assist in the anti-submarine campaign. Initially, SUBLANT designated 12 submarines for the mission, divided into separate divisions to be stationed, respectively, in the Azores and on the southern coast of Ireland. These boats were chosen from the most capable the Navy had to offer: USS *K-1, K-2, K-5, K-6*, and *E-1*, constituting SUBDIV 4, for the Azores; and USS *L-1* through *L-4* and *L-9* through *L-11*, constituting SUBDIV 5, for Bantry Bay, Ireland. At first, the Navy intended to steam the boats across the Atlantic under their own power, but marginal fuel capacity and the unreliability of their rudimentary two-cycle diesel engines militated against that approach. In October, the four K boats left Philadelphia and New York to rendezvous with the submarine tender USS *Bushnell* (AS-2) and the old protected cruiser USS *Chicago* off Provincetown, Massachusetts, from whence they were towed to Halifax, Nova Scotia and then to the Azores, some 1,700 nautical miles to the southeast. Under the prevailing North Atlantic conditions, towing two submarines from each surface ship posed a serious challenge, but when the former attempted to proceed on their own, recurring engine failures left the expedition no choice. Fortunately, after arriving in the Azores – where they were eventually tended by the monitor, USS *Tonopah* (BM-8) – they spent an uneventful year, largely because mechanical problems kept them out of service for much of that period.

The L-boats of SUBDIV 5 – plus *E-1* – left Newport, Rhode Island for Europe in early December 1917 under tow by *Bushnell* and two ocean-going tugs. Bound for Ponta Delgada in the Azores, the group ran headlong into a hurricane and was forced to divert toward Bermuda. Although the flotilla was badly scattered, with one tug and a submarine actually returning to Boston, the other tug and four submarines eventually reached their destination. Then, after several more straggled in, *Bushnell*, a tug, and four submarines completed the remaining 1,000 miles to Bantry Bay on 27 January 1918, with three more boats to follow. They were promptly re-designated the "AL" class to avoid confusion with British L-class submarines and under the tutelage of the Royal Navy, began preparing for their role in the ASW effort off southern Ireland.[2]

The School of War

Three years of actual war experience had given the British a significant advantage in tactical skills compared to their American allies. They had systematized the optimum procedures for the approach and attack of surface targets and computing the lead angle in launch-



By the end of the war, four U.S. submarine divisions had departed for European waters, and two of them saw war service in the Azores and Ireland, respectively. Largely, these boats made the voyage under tow from either Boston or Halifax, and the Ireland-bound boats used the Azores as a way-stop. Inclement weather and the large trans-oceanic distances made these transfers a challenging experience, but no boats were lost either in transit or combat.

ing torpedoes, as well as teaching these techniques in an "attack trainer" that imaged model ships through a periscope during simulated engagements. Among the peacetime habits that U.S. submariners were forced to abandon was the practice of keeping the periscope up for much of the approach, vice gathering sporadic target data during brief, hard-to-detect "looks." Moreover, the Americans also adopted the British practice of assigning the Executive Officer the details of maintaining depth and speed to free up the Commanding Officer to bring the boat into firing position and manage the overall attack. All told, submarines of the Allied navies sank 18 of the 178 German U-boats lost during four years of war. However, during their year or so of active anti-submarine operations from southern Ireland and the Azores, the Americans failed to make a kill.

It was not from lack of trying. Under Vice Admiral Sir Lewis Bayly, RN, in overall command of operations off the coast of Ireland, the seven U.S. "AL" boats at Berehaven in Bantry Bay were assigned regular patrol "billets" in the gridded operations areas to the south and east. On average for much of 1918, three of the seven U.S. submarines would be at sea on eight-day patrols, while the others were enjoying refit periods in port. The basic patrol tactic was to cruise at periscope depth during the day, searching the assigned area for German submarines transiting on the surface and then to come up at night to recharge batteries.[3] The record shows a total of 21 claimed enemy sightings, of which four led to torpedo attacks, none successful. However, in one unusual incident when *AL-2* was returning to port from a fruitless patrol, a periscope was spotted near the Fastnet Rock. Before the submarine could react, a violent explosion was seen only a hundred yards away. After *AL-2* crash-dived and leveled off, her crew could hear the desperate throbbing of small propellers and transmissions from a German underwater signaling set, which eventually ceased. After the war, it was revealed that *UB-65* was lost there that day, possibly destroyed by a torpedo intended for *AL-2*.

Of conditions onboard the U.S. boats, RADM William S. Sims, Commander of U.S. Naval Forces in European waters, wrote in his World War I account, *The Victory at Sea*:

Even on the coldest winter days there could be no artificial heat, for the precious electricity could not be spared for that purpose, and the temperature inside the submarine was the temperature of the water in which it sailed. The close atmosphere, heavily laden also with the smell of oil from the engines and the odors of cooking, and the necessity of going for days without a bath or even a wash added to the discomfort… One could hardly write, for it was too cold, or read, for there was little light; and because of the motion of the vessel, it was difficult to focus one's eyes on the page. A limited amount of smoking was permitted, but the air was sometimes so vitiated that only the most vigorous and incessant puffing could keep a cigarette alight. One of the most annoying things about the submarine existence is the fact that the air condenses on the sides as the coldness increases, so that practically everything becomes wet; as the sailor lies in his bunk this moisture is precipitated upon him like rain drops. This combination of discomforts usually produced, after spending a few hours under the surface, that mental state known as "dopey."

Canadian-born RADM William S. Sims (1858-1936) was designated as the Commander of U.S. Naval Forces in European waters during World War I. An 1880 graduate of the U.S. Naval Academy, Sims became one of the great reformers in naval gunfire and destroyer tactics and ended his Navy career as President of the Naval War College in 1922. *The Victory at Sea*, his account of Allied-American naval cooperation during "the Great War", won the Pulitzer Prize in 1921.

(left) Quite prominent in this photograph of USS *L-1* (SS-40) at Berehaven is her disappearing-mount 3-inch/23-caliber gun just forward of the sail. In the gun's stowed position, only the barrel protruded vertically above the deck. In the background is USS *Nevada* (BB-36), which operated out of Bantry Bay with two sisters in mid-1918 – and survived the Pearl Harbor attack 23 years later to serve throughout World War II.

(below) USS *L-2* (SS-41) at Bantry Bay, Ireland, in mid-1918. The 11 submarines of the L class were commissioned between April 1916 and February 1918, and all eventually crossed the Atlantic to European waters before the end of the war.

U.S. Navy L-class Submarines

Laid down between March 1914 and February 1915, the 11 submarines of the L class were commissioned between April 1916 and February 1918. Seven were built by Electric Boat, three by the Lake Torpedo Boat Company, and one by the Portsmouth Naval Shipyard (to Lake's design). The last named – L-8 (SS-48) – was the first U.S. submarine constructed in a government yard.

Intended primarily for coastal defense, the L-class boats displaced 450 tons surfaced and 548 tons submerged on a length of 168 feet. With two 450-horsepower diesel engines (600-horsepower Busch-Sulzers on the Lake version), they could make 14 knots on the surface and 10-1/2 knots submerged, with endurance of 3,150 nautical miles at 11 knots. Underwater endurance was 25 miles at 8-1/2 knots. The submarines were armed with four 18-inch torpedo tubes (in the bow) and were the first to carry a deck gun – a 3-inch/23-caliber disappearing mount just forward of the bridge. When stowed, only the gun barrel projected vertically, but reportedly this cost them a half-knot in underwater speed. The complement was 28 officers and enlisted men.

Seven of the L-class submarines were stationed at Bantry Bay, Ireland during World War I, and the remaining four had just reached the Azores when the war ended on 11 November 1918. All were decommissioned in 1922 and 1923, and all but two had been sold for breaking up by 1925. L-2 (SS-41) and L-9 (SS-49) were finally disposed of in late 1933.

These were minor annoyances compared to the danger of sudden and violent annihilation by enemy opponents – or more likely – by friendly assailants. By the end of hostilities, each of the Berehaven boats had been attacked at least twice by Allied destroyers or patrol craft in what we would call today "blue-on-blue" engagements. Fortunately, none were lost. In one incident recorded by Admiral Sims, the commanding officers of both the attacker and the attacked had been roommates at Annapolis! Despite the existence of recognition signals and identification protocols, Allied surface ships effectively adopted a "shoot-on-sight" policy for all submarines, which led British and American submariners to clear the area whenever they spotted any surface combatant, regardless of nationality.

Defending the Atlantic Coast

Meanwhile, back in the United States and in operating areas as far afield as the Panama Canal Zone and the Philippines, other U.S. submarines mounted numerous defensive patrols for the duration of the war. Despite the limited endurance of their earlier U-boats and the strategic advantage of concentrating their anti-shipping campaign in "target-rich" European waters, the Germans had demonstrated as early as mid-1916 that they could operate in the western Atlantic and along the U.S. coastline. In July, the large, unarmed, German cargo-carrying submarine *Deutschland* – having broken through the British blockade – appeared in Baltimore with a shipment of chemicals and dyestuffs, which was traded for a quantity of strategic war materials to be carried back to Germany. *Deutschland* made another round trip in November, but by then, the

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Submarine Veteran Visits Arizona Memorial

(below) Sixty-four years after the Pearl Harbor attack, survivor Bill Johnson contemplates the roll of honor inscribed in the USS Arizona Memorial. He visited the memorial to pay respects to the Sailors killed that day, particularly his friend and high school buddy, W. N. Royals.

(left) During his visit, Johnson met with Rear Adm. Paul F. Sullivan, Commander, U.S. Submarine Force U.S. Pacific Fleet, who presented him with a command memento. He also received a pier-side tour of USS *La Jolla* (SSN-701) and toured the Bowfin Museum. Johnson was a Torpedoman 1st Class for seven years, served on USS *Holland* (AS-3), and made several war patrols onboard USS *Devilfish* (SS-292). During his time on *Devilfish*, Johnson and his shipmates survived both a kamikaze attack and an encounter with an enemy minefield.

Submarine Officer Receives Naval Institute Honor

by William Kenny, Submarine Learning Center/
Naval Submarine School Public Affairs

In collegiate and university circles, the maxim is "publish or perish." Those on the faculty know that to remain well regarded by their peers and their institution, they must become writers. For LCDR David Adams, a Prospective Executive Officer (PXO) Course student, the maxim is more "publish or submerge". Adams was recently selected as the Naval Institute's Proceedings first-ever recipient of the Battelle Prize for Writing on Technology and Innovation for his collection of fourteen articles, which he characterizes as a product of his shore duty time.

"I write about things I'm passionate about, that I think are really important," said Adams. "But the writing isn't the key so much as communicating ideas to try to influence the debate on what's important.

"I've always been very interested in policy and strategy – I really started to write while I was at Monterey (Naval Postgraduate School) earning my masters in National Security, and that's when I started to get things published."

Adams was inspired early in his career working for the Secretary of the Navy speechwriter, CDR Neil Golightly, who encouraged Adams' writing talents.

Successfully communicating his passions has resulted in numerous awards for his articles, most recently the Battelle Prize for an essay on a technology he feels is just now showing the promise he first glimpsed years ago, electromagnetic rail guns, which the title of his February 2003 award-wining essay succinctly captured, "Naval Rail Guns Are Revolutionary".

Special Recognition

2004 Society Of Professional Hispanic Engineers Award Winners
Congratulations to winners of The Society Of Hispanic Professional Engineers (SHPE) Technical Achievement Recognition Awards. SHPE is an organization with a proud history of service, promoting the development of Hispanics in engineering, science, and other technical professions to achieve educational excellence, economic opportunity, and social equity.

Hispanic In Technology - Government Award:
LCDR Eduardo Fernandez, Executive Officer,
USS Henry M Jackson (SSBN-730)(Blue)

Most Promising Engineer:
LCDR Edward Robledo, Engineer,
USS Maryland (SSBN-738)(Blue)

Congratulations to ETCS Tony Smith, for his selection as FY 03 Copernicus Award Designee for Submarine Force, U.S. Pacific Fleet.

Congratulations to USS *Salt Lake City* (SSN-716) and USS *Honolulu* (SSN-718) for their selection as winner and runner up, respectively, in The 2004 Ney Food Service Awards Competition.

Congratulations to USS *Frank Cable* (AS-40) for Large Sea Winner in The 2003 Project Good Neighbor Flagship Award. The Project Good Neighbor Awards recognize shore, sea, and overseas commands for outstanding community service projects by presenting awards in five flagship sponsor categories: Personal Excellence Partnership; Health, Safety, and Fitness; Project Good Neighbor; Campaign Drug Free; and Environmental Stewardship.

Qualified For Command

LCDR Douglas Adams
USS Bremerton (SSN-698)

LCDR Michael J. Burinek
CSS-4

LCDR Christopher Buziak
USS Olympia (SSN-717)

LCDR Jeffrey A. Childers
CSS-20

LCDR Charles Cone
USS Pennsylvania (SSBN-735)(G)

LCDR Curtis B. Duncan
CSS-16

LCDR Tood A. Figanbaum
CSS-20

LCDR Todd A. Hofstedt
CSS-20

LCDR Eugene J. Nemeth
CSS-2

LT Gell Pittman
USS Alabama (SSBN-731)(B)

LCDR Justin Richards
USS Alaska (SSBN-732)(B)

LCDR Dennis Robertson
USS Pennsylvania (SSBN-735)(B)

LCDR Kevin Schmidt
USS Parche (SSN-683)

LCDR Eric Severseike
USS Michigan (SSBN-727)

LCDR Lee Sisco
USS La Jolla (SSN-701)

LCDR Brian Sittlow
USS Henry M. Jackson (SSBN-730)(B)

LCDR Michael Varney
USS Topeka (SSN-754)

LCDR Richard Webb
USS Henry M. Jackson (SSBN-730)(B)

Supply Corps Officer Qualified In Submarines

ENS Benjamin Powell
USS Greeneville (SSN-772)

ENS Michael Aldrich
SS Kentucky (SSBN-737)(G)

LTJG Christopher Seifert
USS Asheville (SSN-758)

Qualified Surface Warfare Medical Department Officer:

CDR Rowland McCoy
USS Frank Cable (AS-40)

LCDR Lloyd Sloan
USS Frank Cable (AS-40)

Qualified Surface Warfare Supply Corps Officer:

LT Erik Naley
USS Frank Cable (AS-40)

LTJG Steven Peters
USS Frank Cable (AS-40)

Changes Of Command

USS Michigan (SSBN-727)
CDR Thomas Calabrese relieved
CDR Dietrich Kuhlmann
in a crew consolidation ceremony

USS Georgia (SSBN-729)
CDR John Tammen relieved
CDR Chris Ratliff
in a crew consolidation ceremony

USS San Francisco (SSN-711)
CDR Kevin G. Mooney relieved
CDR Paul A. Povolck

USS City Of Corpus Christi (SSN-705)
CDR Marc W. Denno relieved
CDR Robert J. Schmidt

USS Kentucky (SSBN-737)(B)
CDR Paul Skarpness relieved
CDR Ronald Melampy

NSSC Bangor Stand-Up
CDR Peter Dawson

NSSC Bangor will be the central point for submarine administrative and support functions, with specific areas of responsibility to include Personnel, Medical, Legal, Chaplain, Supply, Combat Systems, Material, Communications, and Waterfront Operations.

CSS-19 Stand-Up
Capt Robert Schuetz

CSS-19 will oversee the operational and pre-deployment training and certification of assigned submarines and ensure each is maintained at optimum readiness to support assigned missions. Ships assigned to CSS-19 will be USS *Georgia* (SSGN-729), USS *Alabama* (SSBN-731), USS *Alaska* (SSBN-732), and USS *Nevada* (SSBN-733).

Line Officer Qualified In Submarines:

LTJG Brett Bateman
USS Henry M. Jackson (SSBN-730)(G)
LTJG William Bundy
USS Portsmouth (SSN-707)
LTJG Robert Carr
USS Greeneville (SSN-772)
TJGL Matthew J. Cegelske
USS Alexandria (SSN-757)
LTJG Gregory Cizin
USS Alabama (SSBN-731)(B)
LTJG Robert-Earl Clark
USS Salt Lake City (SSN-716)
LTJG Michael J. Ellis
USS Dallas (SSN-700)
LTJG Alexander Fleming
USS San Francisco (SSN-711)
LTJG Steven Grossman
USS Greeneville (SSN-772)
LTJG William Harley
USS Columbus (SSN-762)
LTJG Casey E. Hill
USS Memphis (SSN-691)
LTJG Corey Johnson
USS Houston (SSN-713)
LTJG Nikolaus T. Kepproth
USS Annapolis (SSN-760)
LTJG Kevin M. Lewis
USS Montpelier (SSN-765)
LTJG William Lewis
USS Helena (SSN-725)
LTJG Jose Martinez
USS Portsmouth (SSN-707)
LTJG James Moffitt
USS Honolulu (SSN-718)
LTJG Spencer T. Nordgran
USS Oklahoma City (SSN-723)
LTJG Scott Pickford
USS Bremerton (SSN-698)
LTJG Christopher G. Raymond
USS Philadelphia (SSN-690)
LTJG Gary L. Raymond
USS Newport News (SSN-750)
LTJG James Richie
USS Alabama (SSBN-731)(B)
LT Monty W. Rycroft
USS Tennessee (SSBN-734)(B)
LTJG Scott C. Sloan
USS Hampton (SSN-767)
LTJG Joshua Stewart
USS Louisville (SSN-724)
LTJG Michael Vodehnal
USS San Francisco (SSN-711)
LTJG Stephen A. Wiegel
USS Seawolf (SSN-21)
LTJG Stephen B. Wolf
USS Philadelphia (SSN-690)
LTJG Kurt Young
USS Henry M. Jackson (SSBN-730)(G)
LT John Waterston
USS Parche (SSN-683)
LTJG Michael Winn
USS La Jolla (SSN-701)
LT Joshua Wood
USS Jefferson City (SSN-759)
LTJG Daniel Zuckschwerdt
USS Parche (SSN-683)
LTJG Daniel Attaway
USS Kentucky (SSBN-737)(G)
LTJG Kevin Boss
USS Charlotte (SSN-766)
LT Brian Earp
USS Nevada (SSBN-733)(B)
LTJG Eugene Gard
USS Bremerton (SSN-698)
LTJG Robert Garis
USS Olympia (SSN-717)
LTJG Leete Garrett
USS Topeka (SSN-754)
LTJG Robert Gautier
USS Parche (SSN-683)
LTJG Nathan Hall
USS Nevada (SSBN-733)(B)
LTJG Justin Hawkins
USS Greeneville (SSN-772)
LTJG Sterling Jordan
USS Pasadena (SSN-752)
LTJG Brian Kilburn
USS Greeneville (SSN-772)
LTJG Adam Kuehne
USS Pennsylvania (SSBN-735)(G)
LTJG Matthew Luff
USS Nevada (SSBN-733)(B)
LTJG Jeremy Mabe
USS Alabama (SSBN-731)(B)
LTJG Michael Monaghan
USS Los Angeles (SSN-688)
LTJG Derrick O'Brien
USS Bremerton (SSN-698)
LTJG Jeffery Poirier
USS Greeneville (SSN-772)
LTJG James Prouty
USS Henry M. Jackson (SSBN-730)(G)
LTJG Meng Tia
USS Pasadena (SSN-752)
LTJG Steven Van Cott
USS Columbia (SSN-771)
LTJG Mark Vennekotter
USS City Of Corpus Christi (SSN-705)
LTJG Michael Wilcheck
USS Columbia (SSN-771)
LTJG Thomas Woodward
USS Asheville (SSN-758)
LTJG Mike Amerine
USS Bremerton (SSN-698)
LTJG Timothy Berthold
USS Salt Lake City (SSN-716)
LTJG Richard Betancourt
USS Topeka (SSN-754)
LTJG David Duke
USS Portsmouth (SSN-707)
LTJG Christopher Hedrick
USS Cheyenne (SSN-773)
LTJG Marc Hensley
USS Santa Fe (SSN-763)
LTJG Kenneth Holland
USS Buffalo (SSN-715)
LT Jonathon Kim
USS Topeka (SSN-754)
LTJG Mark Longhi
USS Tucson (SSN-770)
LTJG Joseph Patterson
USS Cheyenne (SSN-773)
LTJG Craig Toney
USS La Jolla (SSN-701)
LTJG David Amondson
USS Nevada (SSBN-733)(B)
LTJG David Bailey
USS Topeka (SSN-754)
LTJG Charles Balka
USS Topeka (SSN-754)
LTJG Christopher Gregson
USS Alabama (SSBN-731)(G)
LTJG Christopher Hall
USS Topeka (SSN-754)
LTJG Curtis Hamilyon
USS Nevada (SSBN-733)(B)
LTJG Jonathan Higgins
USS Michigan (SSBN-727)
LTJG Matthew Hoffmann
USS Nevada (SSBN-733)(G)
LTJG Keith Hout
USS Alaska (SSBN-732)(G)
LTJG Karl Kraut
USS Columbus (SSN-762)
LTJG Jason Labani
USS Kentucky (SSBN-737)(G)
LTJG Matthew Lewis
USS Santa Fe (SSN-763)
LTJG Matthew Myers
USS City Of Corpus Christi (SSN-705)
LTJG Earon Rein
USS Topeka (SSN-754)
LTJG Jason Smith
USS Alabama (SSBN-731)(G)
LTJG Steven Stivers
USS Nevada (SSBN-733)(G)
LTJG Jonathan Ward
USS Michigan (SSBN-727)

New Command to Integrate Navy's ASW Mission

by Eric Beheim,
Naval Media Center,
Fleet Support Detachment San Diego

The establishment of the Fleet Anti-Submarine Warfare (ASW) Command marks the beginning of a new era in ASW readiness. Based in San Diego, Fleet ASW Command was officially established during an April 8 ceremony at the Fleet Anti-Submarine Warfare Training Center. RADM John J. Waickwicz was installed as its first commanding officer. Historically, the several platform communities within the Navy – surface ships, aircraft, and submarines – have conducted their ASW operations and training independent of each another. Fleet ASW Command was established specifically to integrate these efforts under a single authority and make them more efficient.

The new command comprises 138 military, civilian and contractor personnel. In addition to its San Diego headquarters, Fleet ASW Command will have detachments in Norfolk, Virginia and Yokosuka, Japan. Its primary focus will be on providing standardized ASW training for the entire Navy, assessing ASW capabilities and readiness throughout the fleet, and implementing the latest state-of-the-art technology in ASW operations.

During his remarks, guest speaker ADM Walter F. Doran, Commander, U.S. Pacific Fleet, emphasized the threat posed by quiet diesel-electric submarines, which nations such as North Korea, China, and Iran continue to acquire. Deployed in the open ocean and in coastal waters, these submarines have the potential to make it difficult for the U.S. Navy to conduct at-sea operations as well as for joint forces to move ashore from the sea. Maintaining underwater supremacy through ASW effectiveness remains a critical core Navy mission.

In establishing the Fleet ASW Command, the Navy continues to demonstrate its commitment to maintaining a 21st century naval force that meets national security needs and retains its operational superiority at sea.

Qualified Nuclear Engineer Officer

LTJG Kevin Boss
USS Charlotte (SSN-766)

LTJG Gustave Dahl
USS Georgia (SSBN-729)(B)

LTJG Robert Carr
USS Greeneville (SSN-772)

LT Roger Cortesi
USS Pasadena (SSN-752)

LTJG Eric Engelbrecht
USS Georgia (SSBN-729)(B)

LTJG Bryan Farmer
USS Pennsylvania (SSBN-735)(G)

LTJG Ryan Frommelt
USS Jefferson City (SSN-759)

LTJG David Grogan
USS City Of Corpus Christi (SSN-705)

LTJG Kostas Hatzidakis
USS Portsmouth (SSN-707)

LTJG Douglas Jonart
USS Pennsylvania (SSBN-735)(G)

LTJG Charles Kelly
USS Tucson (SSN-770)

LTJG Joseph May
USS Pennsylvania (SSBN-735)(G)

LTJG Michael Mercado
USS Asheville (SSN-758)

LTJG Timothy Newberry
USS Ohio (SSGN-726)

LTJG Joseph Nold
USS Helena (SSN-725)

LTJG Michael Palmieri
USS Louisville (SSN-724)

LTJG James Prouty
USS Henry M. Jackson (SSBN-730)(G)

LTJG Matthew Sutphen
USS Ohio (SSGN-726)

LTJG Michael Thomas
USS Honolulu (SSN-718)

LTJG Isak Wold
USS Louisville (SSN-724)

LTJG Daniel Attaway
USS Kentucky (SSBN-737)(G)

LTJG Philip Castellano
USS Asheville (SSN-758)

LTJG Vincent Chen
USS Salt Lake City (SSN-716)

LTJG Martin Dillon
USS Georgia (SSBN-729)

LTJG James Farrow
USS Cheyenne (SSN-773)

LTJG Jason Labani
USS Kentucky (SSBN-737)(G)

LTJG Wendel Penetrante
USS Bremerton (SSN-698)

LT Deryk Petersen
USS Henry M. Jackson (SSBN-730)(G)

LTJG David Pray
USS Jefferson City (SSN-759)

LT Kenneth Princen
USS Parche (SSN-683)

LTJG Warren Ross
USS Charlotte (SSN-766)

LTJG Steven Stivers
USS Nevada (SSBN-733)(G)

LTJG Mark Tschechtelin
USS San Francisco (SSN-711)

LTJG George Arnett
USS Houston (SSN-713)

LTJG Jonathan Beard
USS Michigan (SSBN-727)

LTJG Benjamin Britt
USS Pennsylvania (SSBN-735)(B)

LT William Brooks
USS Asheville (SSN-758)

LTJG Hyun Chun
USS Ohio (SSBN-726)

LT Gregory Corder
USS Helena (SSN-725)

LTJG Jean Domercant
USS Los Angeles (SSN-688)

LTJG Marcus Gioe
USS Chicago (SSN-721)

LTJG Gregory Johnson
USS Pennsylvania (SSBN-735)(B)

LTJG Gregory Klos
USS Ohio (SSBN-726)

LTJG David Payne
USS Alabama (SSBN-731)(G)

LTJG Jason Pepin
USS Nevada (SSBN-733)(G)

LTJG William Reed
USS La Jolla (SSN-701)

LT Micah Smith
USS San Francisco (SSN-711)

LTJG Jesse Stoffel
USS Michigan (SSBN-727)

LTJG Scott Thompson
USS Ohio (SSBN-726)

LTJG Jon Walkwitz
USS Tucson (SSN-770)

LTJG Jamie Weigandt
USS Henry M. Jackson (SSBN-730)(B)

LTJG Ian Hildreth
USS Columbia (SSN-771)

LTJG Joshua King
USS Los Angeles (SSN-688)

LTJG Ramon Medina
USS Jefferson City (SSN-759)

LTJG Roger Montgomery
USS H. M. Jackson (SSBN-730)(B)

LTJG Thomas Resig
USS Alaska (SSBN-732)(B)

LTJG Matthew Schell
USS Buffalo (SSN-715)

LTJG Nicholas Stojanovich
USS Cheyenne (SSN-773)

LTJG Joseph Viera
USS Tucson (SSN-770)

LT Timothy Yanik
USS Louisville (SSN-724)

Qualified Surface Warfare Officer:

ENS George Grovner III
USS Frank Cable (AS 40)

ENS Samuel Merritt
USS Frank Cable (AS 40)

CWO2 David Moriarity
USS Frank Cable (AS 40)

CWO3 Raymond Spann
USS Frank Cable (AS 40)

LT Lawrence Upchurch
USS Frank Cable (AS 40)

CWO2 Clyde Wright
USS Frank Cable (AS 40)

LTJG Bryan Robertson
USS Frank Cable (AS 40)

ENS Alex Torres
USS Frank Cable (AS 40)

Limited Duty Officer Qualified In Submarines:

LCDR Edison Henry
USS Dolphin (AGSS 555)

LT Michael Anderson
USS Michigan (SSBN-727)

LT Nicholas Milano
USS Michigan (SSBN-727)

LTJG Dean Whitehouse
CSS-1

USS *Frank Cable* Diver Conducts Hull Repairs

Gunner's Mate 3rd Class Ryan Griggs steadies a fastener while conducting repairs on a *Los Angles*-class fast attack submarine deployed to Guam. Petty Officer Griggs is assigned to the submarine tender USS *Frank Cable*'s (AS-40) dive locker, which repairs and maintains deployed submarines in Guam.

School of War

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combatant submarine *U-53* had also crossed the Atlantic to visit Newport, Rhode Island – and then sank five Allied freighters just outside the territorial limits before returning home.

Thus, when the United States entered the war in April of the next year, there was already significant anxiety about a potential submarine threat off the East Coast. Further exacerbating this concern was the Navy's relative lack of first-line destroyers – approximately 50 in mid-1917 – and the decision to send most of those to Europe. A massive building program was already underway – it would lead to the eventual construction of 273 four-stack, "flush-deck" destroyers by 1921 – but for the rest of 1917, only five would be launched, and the need to escort troop convoys to France took top priority. As a stopgap, U.S. submarines were drawn increasingly into the anti-submarine campaign on the Atlantic and Gulf Coasts, and two divisions were even shifted from Hawaii and Puget Sound to bolster their ranks.

By the beginning of 1918, small detachments of older U.S. submarines were patrolling regularly from Provincetown, New London, Cape May, the Delaware Breakwater (near Cape Henlopen), Philadelphia, Hampton Roads, Charleston, Key West, Galveston, the Virgin Islands, Bermuda, and Coco Solo in the Canal Zone. But in fact, a significant submarine threat only materialized along the U.S. East Coast for a few months in mid-1918, when Germany deployed a half-dozen long-range mine-layers and large "U-cruisers" – patterned after *Deutschland* – across the Atlantic in a last-ditch attempt to disrupt the American war effort. First to arrive was *U-151*, which left Kiel in mid-April, mined the entrances to both the Chesapeake and Delaware Bays, severed several telegraph cables near New York, and sank 23 ships totaling 61,000 tons off New Jersey and Cape Hatteras before breaking off in mid-June.[4] During the remainder of the summer, several more German long-range submarines carried out anti-shipping missions along the coast, sinking in excess of 50,000 additional tons – including the Diamond Shoals lightship – and planting minefields that destroyed at least seven more ships, among them the heavy cruiser USS *San Diego* (CA-6). Additionally, a submarine-laid mine heavily damaged the battleship USS *Minnesota* (BB-22) off Fire Island.

Despite this appearance of success and the ineffectiveness of the rudimentary ASW measures mounted by U.S. submarines, patrol craft, and airplanes, the brief German submarine campaign off the U.S. East Coast came too late in the war to affect the outcome. The total loss of Allied shipping was only a fifth or so of that sunk in a single month during the height of the conflict in European waters, and the gathering industrial capacity of the United States was fully capable of offsetting an even more dramatic toll. Nonetheless, the Germans had demonstrated convincingly that modern submarines could operate effectively over transoceanic distances and that a mere handful could divert a disproportionate share of naval resources to coastal defense.

The End of the Beginning

As Allied successes on the Western Front drove the Great War toward its final denouement in the autumn of 1918, two more divisions of U.S. submarines departed for Europe. First, the four Lake-designed L-boats of SUBDIV 6 (*L-5* through *L-8*) left Charleston for the Azores on 20 October. They arrived at Ponta Delgada on 7 November, four days before the Armistice on the 11th. On 2 November, the tender USS *Savannah* (AS-8) and the recently-completed submarines *O-3* through *O-10* – constituting SUBDIV 8 – left Newport for Bantry Bay. They arrived in the Azores on 16 November, five days after the end of the war, and were quickly recalled.

When the fighting stopped, the Navy had 74 submarines in commission, with 59 more under construction. Except for two submarines sunk in accidents – *F-4* off Honolulu in 1915 and *F-1* near San Diego in 1917 – no U.S. submarines had been lost during the conflict. Moreover, by early February 1919, all of the boats that had served in the Azores and southern Ireland had re-crossed the Atlantic and returned to the United States. By the end of 1923, all had been decommissioned, replaced by the new S-class boats whose design and construction had benefited from the many lessons learned during the "Great War." More significantly, the cumulative experience of U.S. submariners in European waters – and the wartime example of their counterparts in the Royal Navy and the German *Kriegsmarine* – provided a firm foundation for developing the world-class submarine force that emerged in the United States between the mid-1920s and the late-1930s.

Dr. Whitman is the Senior Editor of UNDERSEA WARFARE.

Notes

[1] The secret Zimmerman telegram – sent by German foreign minister Arthur Zimmerman to Germany's U.S. ambassador in January 1917 – revealed a suggestion to the Mexican government that the southwestern United States could be restored to Mexico if that country would ally itself with Germany in a victorious war. The message was intercepted by the British, decoded, and obligingly passed to the Americans, who were naturally outraged.

[2] In December 1917, the U.S. Navy also sent a division of five battleships to the Royal Navy's fleet anchorage at Scapa Flow in the Orkney Islands, where they constituted the 6th Battle Squadron of the British Grand Fleet. Moreover, three U.S. battleships operated out of Bantry Bay later in the war, and eventually, over 40 U.S. destroyers served in European waters, the first arriving in May, 1917.

[3] In *The Victory at Sea*, his account of the U.S. Navy in World War I, RADM William S. Sims, the commander of U.S. forces in European waters, claims that the relative success of Allied submarines in hunting their German counterparts was due to the closer proximity of the Allied bases, which enabled them to operate submerged for a much greater percentage of the time. Moreover, the German anti-shipping campaign required the Germans to operate on the surface to maximize their area coverage.

[4] Under Korvetten-Kapitan Heinrich von Nostitz und Jänckendorf, *U-151* covered nearly 11,000 miles in 94 days in one of the greatest submarine war patrols of all time. In addition to sinking six ships in one day off the coast of New Jersey, von Nostitz intercepted the Norwegian freighter *Vindeggen* off Cape Hatteras and substituted its cargo of copper ingots – in short supply in Germany – for his own iron ballast before sailing home. More remarkably, by adhering strictly to the traditional rules of "cruiser warfare" and putting passengers and crews "in a place of safety" before sinking their ships, he caused minimal loss of life.

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Undersea Warrior Learns to Fly

by JO3 Corwin Colbert,

Onboard USS *Cheyenne* (SSN-773), submariners spend long working hours preparing the submarine for getting underway. But for one of the crew, the little time he has for himself is spent learning in a totally different environment.

EM2(SS) Jay McKnight, a nuclear electrician onboard *Cheyenne*, spends his time off working toward a private pilot's license for the single-engine Cessna aircraft. "A Cessna is the first plane you learn to fly," said McKnight. "The school is over at the Honolulu International Airport, but you can take classes at most major or regional airports."

"The training is 30 hours in the air, plus basic flight school. Twenty hours is spent with the instructor's guidance and 10 hours with the instructor observing. The instructor's test uses a CD program," he added. "I've been learning to fly since August and have completed 24 hours and all the written exams. I need just six more hours and a final exam."

McKnight explained that the classes are made up of different areas of concentration, and everything learned there is critical to flying safely. "You learn how to make your own flight plan, how much fuel you're going to need, about the weather and your angle of attack. Everything you learn is important. Let's say the winds are strong – you burn more gas when you go against it," he said.

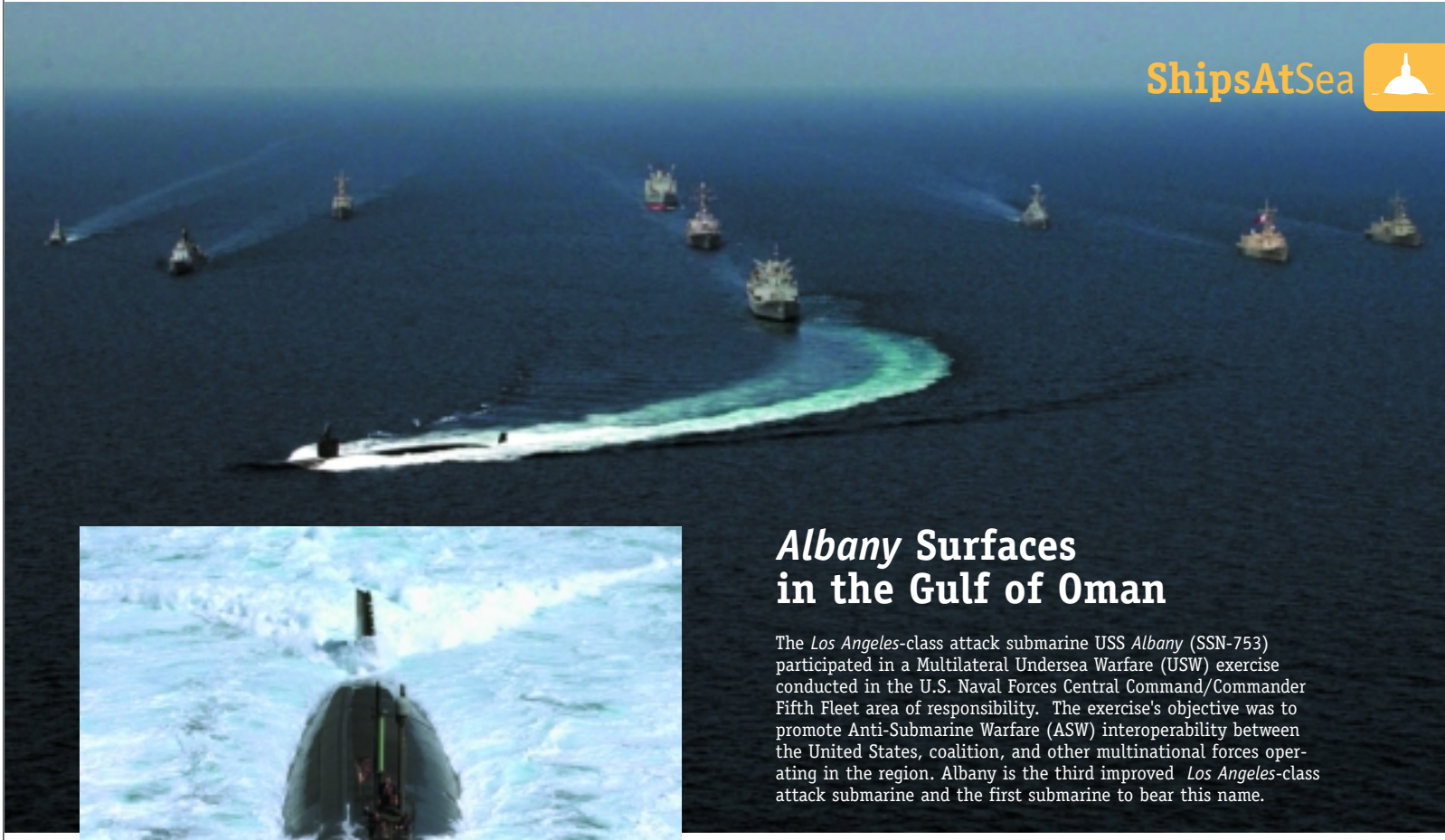
Giving up his rare spare time is not the only thing that McKnight contributes. He spends a considerable amount of money learning to fly and hopes in the end it will be worth the investment. "The expenses are pretty steep. It costs about $200 per hour a basic flight instruction. You also have to pay for your gas – about $75 dollars per class – and other expenses. I have over $4000 invested already," he said.

As much fun as he has in the air, McKnight has had to put his quest for a pilot's license on the back burner as regular duties onboard *Cheyenne* have become more demanding during workups for deployement. This is echoed by one of McKnight's fellow electricians, EM2 (SS) Alex Moriarty. "Electrical Division has one of the largest workloads on the boat. We have to dig and scrape for time off, and it doesn't come very easy. I think what McKnight is doing is great. I previously held a class- A skydiving license, and it was a great way to blow off some steam and pressure. Any time you can find an activity like that away from the boat, it's a good thing," said Moriarty.

According to McKnight, his interest in flying came from watching air shows and from the influence of several peers. "I've always wanted to fly. It is the most liberating experience, except for skydiving and rock climbing, which are my other two favorite things to do," he said. I first got interested when I attended an air show some time ago, and originally, I wanted to fly fighter planes. A friend of mine was getting his license, and that inspired me to get mine as well. Now he's getting his commercial ticket, but that takes a lot of time and money," said McKnight. "Anyhow, it's a lot of fun and I enjoy it," he added.

Santa Fe Receives Warm Welcome

USS *Santa Fe* (SSN-763) returned home to Pearl Harbor, following a successful six-month deployment in the Western Pacific. The *Santa Fe* Sailors were greeted by the Apache Belles Precision Dance and Drill Team from Tyler Junior College in Tyler, Texas. The homecoming was especially welcoming for Tyler native, Machinist Mate Fireman Raymond Dalton, who was greeted by the team individually. "The cruise was great, but the last nine days have been very long. We knew the Belles were coming about four days in advance," said Dalton. "It's nice to see them."



Albany Surfaces in the Gulf of Oman

The *Los Angeles*-class attack submarine USS *Albany* (SSN-753) participated in a Multilateral Undersea Warfare (USW) exercise conducted in the U.S. Naval Forces Central Command/Commander Fifth Fleet area of responsibility. The exercise's objective was to promote Anti-Submarine Warfare (ASW) interoperability between the United States, coalition, and other multinational forces operating in the region. Albany is the third improved *Los Angeles*-class attack submarine and the first submarine to bear this name.

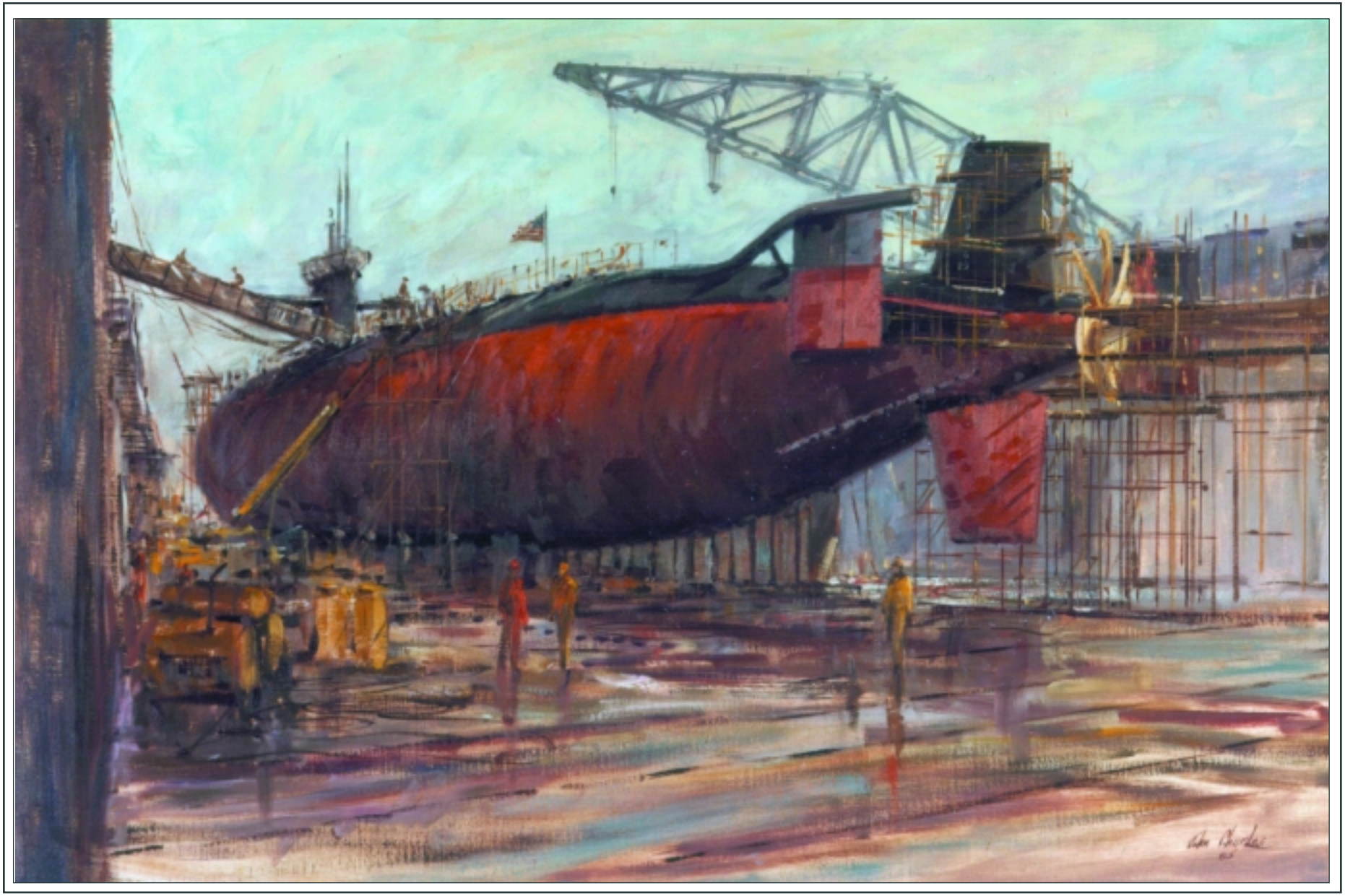
Photo by PH1 Alan D. Monyelle

Sonar Technician 3rd Class Russell Franklin stands security watch on a 50-caliber machine gun, while Sonar Technician 3rd Class Aaron Getz scans the port's channel, as the guided missile destroyer USS *McFaul* (DDG-74) gets underway. The *Arleigh Burke*-class destroyer also participated in the Multilateral Undersea Warfare (USW) exercise.

On The Back

"Spadefish in Resolute--Norfolk, Virginia" John Charles Roach is an official Navy artist whose training began with three years of study in Paris at the National Academy of FIne Arts and culminated in a Master's Degree from American University. He served in Vietnam with the 7th Fleet as an official Navy Artist to document naval activities in-country and offshore. On active duty in the Naval Reserves he has completed artist assignments depicting the Submarine Force of the 1980s, Desert Shield, Desert Storm, and Bosnia-Herzegovina. Among his private commissions, he designed and sculpted elements of the Navy Memorial in Washington, DC and completed a mural for the USS Arizona Visitors Center in Honolulu, Hawaii.

Artwork and artist information courtesy of the Navy Art Gallery.



Spadefish in Resolute – Norfolk, Virginia

by John Charles Roach